

# IX Response Action Contract



U.S. Environmental Protection Agency  
Contract No. 68-W-98-225

**CH2M HILL, Inc.**

and Team Subcontractors:

**URS Greiner Woodward Clyde Federal Services, Inc.**

**E2 Consulting Engineers, Inc.**

**FINAL  
SECOND 5-YEAR REVIEW REPORT**

**FOR  
KOPPERS COMPANY, INC.  
SUPERFUND SITE  
OROVILLE, CALIFORNIA**

**February 2003**

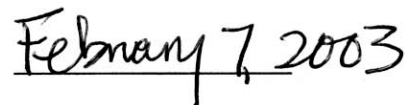
**Prepared for  
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U.S. Environmental Protection Agency  
Region IX  
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## List of Acronyms

ARARs	Applicable or Relevant and Appropriate Requirements
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	contaminant of concern
cy	cubic yards
DNAPL	dense nonaqueous-phase liquid
DTSC	Department of Toxic Substances Control
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
gpm	gallons per minute
IPE	isopropyl ether
KII	Koppers Industries, Inc.
L-P	Louisiana Pacific
MCL	maximum contaminant level
PAH	polynuclear aromatic hydrocarbons
PCDDs/PCDFs	polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans
PCP	pentachlorophenol
ppb	parts per billion
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
RWQCB	Regional Water Quality Control Board
Site	Superfund Site
TBC	to be considered
TCDD	tetradichlorodibenzo-p-dioxin
TI	Technical Impracticability

## 5-year Review Summary Form

### SITE IDENTIFICATION

**Site name :** Koppers Company, Inc.

**EPA ID: CERCLIS ID #:** CAD009112087

**Region:** IX      **State:** CA      **City/County:** Oroville / Butte

### SITE STATUS

**NPL status:** ☒ Final ☐ Deleted ☐ Other (specify) \_\_\_\_\_

September 21, 1984

**Remediation status** (choose all that apply): ☒ Under Construction ☒ Operating ☒ Complete

**Multiple OUs?** ☐ YES ☒ NO      **Construction completion date:**

Soil and Ground Water Operable Unit (Sitewide)

Has Site been put into reuse? ☐ YES ☒ NO

### REVIEW STATUS

**Reviewing agency:** ☒ EPA ☐ State ☐ Tribe ☐ Other Federal Agency \_\_\_\_\_

**Author name:** Charles Berrey

**Author title:** Remedial Project Manager

**Author affiliation:** EPA Region IX

**Review period:** July - September 2002

**Date(s) of Site inspection:** NA

**Type of review:** ☒ Statutory

☐ Policy

(☐ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only

☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead

☐ Regional Discretion)

**Review number:** ■ 2 (second)

**Triggering action:**

☐ Actual RA Operation of Groundwater

■ Previous 5-year Review Report

Remedial Systems

☐ Construction Completion

☐ Other (specify) \_\_\_\_\_

**Triggering action date:** December 1997

**Due date (five years after triggering action date):** 2002

**Issues / Recommendations and Follow-up Actions:**

An outstanding issue relating to Record of Decision Amendment No. 2 is implementation of a deed restriction. Currently, the language for the on-property deed restriction is under negotiation and anticipated to be completed by August 2003.

The concentration of pentachlorophenol in well 86 has increased to greater than the Record of Decision standard since 2000. Recommended follow-up action for well 86 includes ongoing evaluation of groundwater monitoring chemical and hydraulic data to verify plume capture by the on-property groundwater extraction system. Additional follow-up actions may be necessary based on the results of this evaluation.

The concentration of boron in groundwater from well MW-8 has been increasing since 2001. Currently extraction, dilution, and diversion to the on-property treatment plant has been adopted as a temporary remedy for this problem. Recommended follow-up actions include evaluation of the hydraulic effects of extraction at well MW-8 and the chemical concentration of boron in groundwater (influent concentration) to ensure that the current technologies are effective. An ongoing evaluation will determine whether additional follow-up actions are required.

New circumstances, primarily the limited number of downgradient groundwater monitoring points in relation to the on- and off-property *in situ* bioremediation program and their location with respect to the injection point, make it difficult to evaluate the effectiveness of this remedial program. Additional monitoring wells were not installed as part of the *in situ* bioremediation program because difficult drilling conditions make them cost prohibitive (the cost of additional monitoring wells is significantly greater than the total cost of the *in situ* bioremediation program). The existing monitoring well network does not allow the distinction to be made between the relative contributions of natural attenuation, dilution, and the *in situ* bioremediation program. However, the pentachlorophenol concentration has decreased since the onset of the program, and therefore the remedy is considered adequate.

Issues identified during the document review are with regard to the Annual Groundwater Monitoring Report; specifically, the Technical Impracticability zone should be included on all Site figures, given the significance of this area as a potential source of contamination. Additionally, consideration should be given to the scale of the concentration versus time plots; a log scale is recommended because of the large reductions in concentrations since monitoring was

initiated in 1985. Concentration trends following the commencement of the *in situ* bioremediation program could be better evaluated as a result.

**Protectiveness Statement:**

Currently all implemented remedies are functioning as intended by the decision document and, therefore, are protective of human health and the environment at this time.

## Executive Summary

The United States Environmental Protection Agency completed a second 5-year review of the remedial actions implemented at the Kopper's Company, Inc., Superfund Site (the Site), located east of Highway 70 in Oroville, California. The 5-year review was required by statute because hazardous substances, pollutants, or contaminants remain and will remain on property above levels that allow for unlimited use and unrestricted exposure. The triggering action for this 5-year review was the first 5-year review, conducted during 1997. The purpose of the 5-year review process is to evaluate whether the remedial measures implemented at the Site are protective of human health and the environment.

The Site is bounded by the former Louisiana-Pacific Lumber Mill to the west, Georgia Pacific Way to the north, and Bagget-Marysville Road to the south and east. Historically, wood treatment operations were conducted at the Site. Residual waste was discharged to unlined evaporative basins. Product handling and two fires (1963 and 1987) have also contributed to contamination at the site.

Pentachlorophenol (PCP)-contaminated groundwater was first identified on property in 1971, and was identified the following year in residential drinking water supply wells located southwest of the Site. A Record of Decision (ROD) was signed for the Site in September 1989, detailing four main impacted soil locations and impacted groundwater on and off property. Chemicals of concern at the site include: PCP, isopropyl ether, polynuclear aromatic hydrocarbons, polychlorinated dibenzo-p-dioxins/polychlorinated dibenzofurans, arsenic, barium, boron, chromium, and copper. Beazer East Inc., through a corporate buyout agreement, is responsible for Superfund activities at the Site.

The ROD-selected remedies are intended to reduce contamination to protective health levels consistent with potential future residential exposure. Remedies selected for groundwater, as stated in the ROD, are to achieve remedial standards based on the more stringent of  $10^{-6}$  excess cancer risks from use of groundwater as a drinking water supply or California action levels. The provision of an alternate water supply to those affected by the contamination until remedial objectives are met was also formalized.

An Explanation of Significant Differences was issued in January 1991, stating that soil remediation would be limited to 5 feet unless a potential source of contamination to groundwater was found. ROD Amendment No. 1 was issued in August 1996, changing the soil remedy to an onsite landfill, and risk levels from residential to industrial with provisions for institutional controls.

ROD Amendment No. 2 was issued in September 1999, modifying the groundwater remedy to provide for: (1) a 4-acre technical impracticability waiver due to the presence of dense nonaqueous-phase liquids (DNAPL as creosote); (2) adding enhanced *in situ* bioremediation to the remedy both on and off property; (3) providing monitored natural attenuation as a contingency remedy; and (4) lowering the standard for PCP to 1.0 part per billion for groundwater and raising the standard for barium to 1,000 parts per billion for groundwater.

All ROD, Explanation of Significant Differences, ROD Amendment No. 1, and ROD Amendment No. 2 selected remedies have been implemented, including soil removal in the former process area (Area 8C). Following closure of the operating facility in 2001, excavation

of contaminated soils from the Area 8C former process area was completed during September 2002.

New information influencing the 5-year review includes the following two unanticipated contaminant detections at the site as remedial action has progressed:

- PCP concentration in groundwater in well 86 has increased from below the ROD standard to concentrations exceeding 50 parts per billion since the year 2000; recommended follow-up action includes the ongoing evaluation of groundwater concentration data.
- Boron was initially (and continues to be) detected in soil and groundwater during the fourth quarter of 2001 in the vicinity of well MW-8. Boron in soil was addressed during the Area 8C remedial construction (August to September 2002) and is being monitored in groundwater to confirm the success of the removal action. Additionally, groundwater is extracted from MW-8 and diluted with influent water from EW-1 and EW-2, prior to being sent to the on-property groundwater treatment system. Recommended follow-up action includes ongoing evaluation of the concentration of boron in groundwater and the success of the current treatment program.

One outstanding issue identified during the 5-year review process is lack of implementation of a remedial action mandated in ROD Amendment No. 2. This action is to implement deed restrictions. Recommended follow-up should include completion and approval of this documentation.

Another outstanding issue identified during the 5-year review process is the need for additional downgradient monitoring wells. It is difficult to evaluate the effectiveness of the on- and offsite *in situ* bioremediation program given the limited number of downgradient sampling points and their location with respect to the injection point. At this time, additional downgradient monitoring points are recommended to increase data capture and decision-making abilities. However, additional monitoring wells have not been installed as part of the *in situ* bioremediation program because difficult drilling conditions make them cost-prohibitive (the cost of additional monitoring wells is significantly greater than the total cost of the *in situ* bioremediation program). The existing monitoring well network does not allow the distinction to be made between the relative contributions of natural attenuation, dilution, and the *in situ* bioremediation program. However, the PCP concentration has decreased since the onset of the program, and therefore the remedy is considered adequate.

Beazer provides 7 of 38 residences with alternative water. Continued ongoing evaluation of this program is necessary to ensure protectiveness.

Currently, all implemented remedies are found to be functioning as intended by the decision document and, therefore, are protective of human health and the environment at this time.

**Second 5-year Review Report  
Koppers Company, Inc., Superfund Site  
Butte County, California**

## 1.0 Introduction

The United States Environmental Protection Agency (EPA) has conducted a second 5-year review of the remedial action implemented at the Kopper's Company, Inc., Superfund Site (also referred to as "Koppers Site," "Koppers," or "the Site") located south of Oroville, California, east of Highway 70. CH2M HILL was contracted under EPA Region IX's Response Action Contract to prepare this report, which documents the results of the 5-year review.

The purpose of the 5-year review process is to evaluate whether the remedial measures implemented at the Site are protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in 5-year review reports. In addition, 5-year review reports identify any deficiencies found during the review and provide recommendations for addressing them.

By statute, EPA must implement 5-year reviews consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan. CERCLA Section 121(c), as amended, states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the Site, the President shall review such remedial action no less often than each 5 years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

The National Oil and Hazardous Substances Pollution Contingency Plan part 300.430(f)(4)(ii) of the Code of Federal Regulations states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the Site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

Consequently, this 5-year review was performed because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unrestricted use and unlimited exposure.

This is the second 5-year review for the Koppers Site. EPA conducted an initial 5-year review in December 1997. No deficiencies were noted at that time. In the first 5-year review, EPA concluded that the existing pump-and-treat system was successfully remediating the immediate threats posed by the Site. The triggering action for this statutory review is the date of the first 5-year review, as shown in EPA's WasteLAN-database: December 22, 1997.

## 2.0 Site Chronology

Table 2-1 provides a chronology of events at the Site.

**Table 2-1: Chronology of Site Events**

Event	Date
Mine dredging operations were conducted at the Site.	1900s
Hutchinson Lumber Mill operated at the Site.	1920 to 1948
Wood was treated at the Site with chemicals including, but not limited to, pentachlorophenol (PCP), creosote, and chromated copper arsenate solution to prevent wood deterioration by insects or fungi.	1948 to 2001
Lumber mill facility operated at the Site, concurrently with the wood treatment operations.	1952 to 1962
Process residuals were discharged to unlined creosote settling ponds.	Approximately 1952 to 1973
Koppers purchased the property and wood treating operations from the National Wood Treating Company.	1955
Cellon blowdown area was used for residual waste disposal.	1961 to 1973
A fire occurred at the Site; debris was buried on property, and approximately 20,000 gallons of PCP were released from tanks.	1963
Pole-washing unit was used, and residual waste was discharged nearby to an unlined surface impoundment.	1963 to 1973
PCP-contaminated groundwater was first documented on property.	1971
PCP was discovered in nearby residential wells.	1972
Regional Water Quality Control Board (RWQCB) issued an order for cleanup, including (1) the installation of two groundwater recovery wells, (2) extraction of contaminated groundwater and discharge to spray fields on property, (3) excavation of buried debris from the 1963 fire for offsite disposal, and (4) construction of wastewater treatment process to discontinue use of unlined ponds.	1973
Waste disposal area in the eastern spray field (fire debris), the two areas in the western spray field (fire debris), and the cellon blowdown area were excavated; and the soils were disposed of at the soil bed of the biological wastewater treatment unit. Associated fire debris was removed to an approved offsite landfill.	1973
Biological wastewater treatment unit was used for the disposal of all residual wastes.	1973 to 1988

**Table 2-1: Chronology of Site Events**

<b>Event</b>	<b>Date</b>
Koppers installed and began operation of two recovery wells (RW-1 and RW-2) to recover PCP in local groundwater in accordance with the RWQCB order.	1974
Concentrations of PCP in offsite wells decreased, and the RWQCB order was rescinded.	1974
The RWQCB issued a Cease-and-Desist order directing Koppers to end discharge of PCP into soil at the plant and prepare a work plan detailing (1) remedial actions to mitigate damage caused by contaminants flowing west, (2) process changes needed to prevent future contamination, and (3) alternatives for treating excavated soil.	1982
The Site was proposed for placement on the National Priorities List.	September 1983
Groundwater contamination in residential wells was found more than 1 mile south of the Site.	December 1983
Bottled water was supplied to 45 residences with impacted drinking water supply wells.	March 1984 to 1986
The Site was placed on the National Priorities List.	September 1984
Groundwater monitoring program was initiated.	June 1985
Use of PCP in the wood treating process was phased out.	1986 to 1988
Private residences within areas of impacted groundwater were connected to an alternate water supply (Oroville-Wyandotte Irrigation District).	March 1986 to date
A Consent Order was signed between Koppers and EPA, requiring completion of the remedial investigation and feasibility study.	April 1986
Explosion and fire occurred at the Site. EPA issued a unilateral removal order for the cleanup, removal, and stabilization of soil.	April 1987
A temporary chip-seal cap was constructed over process area.	1987 to 1988
Beazer bought Koppers and the associated Site.	1988
Operations ceased at the Former Biological Treatment Facility (soil) on property.	1988
Department of Health Services sampled neighboring properties and found elevated dioxins in chicken eggs; an advisory was issued, and the source of areawide trace dioxin was not determined.	March 1988
Remedial investigation report completed.	June 1988

**Table 2-1: Chronology of Site Events**

<b>Event</b>	<b>Date</b>
Risks evaluated by EPA and reported in an Endangerment Assessment Report.	November 1988
Beazer sold the Koppers Superfund Site to Koppers Industries, Inc. (KII), yet Beazer retained responsibility for CERCLA matters at the Site.	December 1988
Feasibility study completed.	May 1989
Record of Decision (ROD) for cleanup of groundwater and soil was issued for the Site.	September 1989
Explanation of Significant Difference (ESD) issued for the Site that limited soil remediation to 5 feet unless a potential contaminant source to groundwater was found.	January 1991
Consent Decree made between EPA and Beazer agreeing that Beazer would conduct remedial action work.	February 6, 1992
Completed bench-scale treatability test for soil washing.	1992
Two concrete drip pads were installed in the process area.	1992
Completed pilot testing for soil washing.	1993
Concentrations of polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDDs/PCDFs) above industrial standards for workers, as cited in ROD, were detected in surface soil.	1993
Off-property groundwater remediation system started.	March 1993
On-property groundwater remediation system started.	February 1994
Shallow groundwater investigation completed.	June 1994
Product recovery well (PR-01) installed.	1994
Soil Fixation Treatability Study completed.	1994
Long-term groundwater pilot bioremediation system initiated in the former creosote pond area.	July 1995
Construction of onsite landfill, Cell No. 1, completed.	August 1995
Off-property groundwater remedial system was taken off-line because the plume retreated. The extraction wells were no longer effective in capturing the plume.	December 1995
Soil removal action performed to selectively remove impacted dioxin-contaminated soil and place in Cell No. 1 (15,000 cubic yards [cy] of soil).	1995

**Table 2-1: Chronology of Site Events**

Event	Date
ROD Amendment No. 1 issued for the Site, changing the soil remedy to an onsite landfill. Cell No. 2 was constructed and partially filled (completed in 2002).	August 1996
Former creosote pond was excavated to 14 feet below ground surface (bgs) (approximately 11,216 cy of soil). Soil placed in Cell No. 2.	1996
Excavated pole washer area (Area 5) to depths of up to 20 feet bgs; removed 4,830 cy. Backfilled with plastic, low-permeability soils beneath, and coarse, gravely on-site soils on top.	September 1997
First 5-year review completed.	December 1997
Excavated former cellon blowdown area to 10 feet bgs (approximately 11,130 cy of soil).	1997
Implemented onsite enhanced bioremediation program in the eastern part of the on-property PCP plume.	March 1998
Restriction for domestic drinking water for 26 residences removed.	April 1998
Implemented revised off-property groundwater <i>in situ</i> bioremediation program.	August 1998
ROD Amendment No. 2 issued, modifying the groundwater remedy to provide for (1) 4-acre Technical Impracticability (TI) zone, (2) adding enhanced <i>in situ</i> bioremediation to the remedy, (3) providing monitored natural attenuation as a contingency remedy, and (4) groundwater standards changed for PCP (1 part per billion [ppb]) and barium (1,000 ppb).	September 1999
Koppers ceased operations and began work on Resource Conservation and Recovery Act (RCRA) closure, overseen by Department of Toxic Substances Control (DTSC).	March 15, 2001
Restriction for domestic drinking water for one residence removed (seven remaining).	April 2001
<i>In situ</i> bioremediation in the area of the former creosote pond was terminated at the request of Beazer, because additives apparently resulted in increased mobility of polynuclear aromatic hydrocarbons (PAH).	June 2001
Soil removal completed. Approximately 40,000 cy of material removed from former process areas and new Dri-Con source site.	September 2002

## **3.0 Site Background**

The Koppers Company, Inc., Superfund Site is an area of approximately 205 acres located in Butte County, in the southern portion of the City of Oroville. The topography of the Site slopes toward the southwest. Koppers is bounded by the former Louisiana Pacific (L-P) Lumber Mill to the west, Georgia Pacific Way to the north, and Bagget-Marysville Road to the south and east (see Figures 1 and 2; all figures are located after Section 9.0). Remnants of mining dredge operations during the 1900s remain throughout the northern portion of the Site.

### **3.1 Overview of Physical Site Characterization**

#### **3.1.1 Physiography**

The Site is located on the northeastern margin of the Sacramento River Valley, where fluvial deposits adjoin the foothills of the Sierra Nevada mountain range (Dames and Moore, 1988). Koppers lies within the Feather River Floodplain, which is approximately 2.7 miles wide near the Site. Elevation of the Site is at approximately 145 feet above sea level. A historical mining tailing pile is present at the northern area of the property at approximately 120 feet above sea level (EPA, 1989).

#### **3.1.2 Drainage**

Drainage basins in the vicinity of the Site include the L-P ditch, the Koppers ditch, the Feather River, and the Wyman Ravine. The L-P ditch and Koppers ditch, located west of the Site, drain to the L-P pond, which could overflow to the Feather River during a 100-year storm (EPA, 1999). The Feather River is located approximately 3,000 feet west of the Site, trending west-southwest at approximately 130 feet above sea level. During periods of high runoff, some surface runoff from the Site may reach the river. The Wyman Ravine is located approximately 2 miles south of the Site and flows west to Palermo Road, then turns south. The Wyman Ravine is perennial, flowing only during periods of high runoff, and is topographically separated from the Site by a large bluff (Dames and Moore, 1988). It should be noted that current remedial actions on the property have resulted in modified surface flow locally, yet maintained the general southwest overland flow direction.

#### **3.1.3 Climate**

The climate at the Site is semi-arid. Temperatures range from 32 to 110 degrees Fahrenheit, with a mean annual precipitation of approximately 27 inches locally. The rainy season generally occurs from September to May, with maximum rainfall occurring during January (HSI Geo Trans, 1999a).

#### **3.1.4 Geology/Hydrogeology**

The geologic units defined in the vicinity of the Site, from oldest to youngest, include Ione, Mehrten, Nomlaki Tuff, and Laguna Formations (Dames and Moore, 1988).

The oldest geologic formation, Ione, generally begins at depths of 240 to greater than 300 feet bgs. Regionally, this formation is a result of channel, floodplain, and deltaic system deposits formed under a humid, subtropical climate. Locally, the Ione Formation could have

been deposited under marine conditions, due to the high salinity of groundwater within this unit. Predominant soil types comprising this formation include fine to coarse sand, silt, lignite, and variegated clays (HSI Geo Trans, 1999b).

Fluvial deposition and subsequent channel erosion resulted in the Mehrten deposit unconformably overlying the Ione Formation. This formation is absent at most of the Site but, where present, consists of volcanic detritus containing crystalline basement-derived clasts and rare tuff beds. The Nomlaki Tuff Formation, while regionally common, is also rare at the Site due to the erosion which resulted in deposition of the Laguna Formation. The Nomlaki Tuff Formation comprises white, pumice-rich, water-deposited, vitric tuff (HSI Geo Trans, 1999b).

Due to channel erosion, the Laguna Formation overlies the Ione Formation throughout most of the Site. The primary units comprising this formation include sandy gravel, sand, and sandy clay.

Dredge mining operations during the 1900s to the 1930s resulted in alterations to the natural fluvial and overbank surface and shallow subsurface soils. Dredge tailings were graded and leveled at portions of the Site, resulting in varying thickness from 1 to 5 feet overlying the native soils (Dames and Moore, 1994). The northern and far western areas of the Site are characterized by road base fill material underlain by dredge tailings classified as clayey gravels, whereas the southern portion is underlain by Quaternary fluvial sediments of the Laguna Formation (Dames and Moore, 1992). Fill materials on disturbed areas of the Site consist primarily of gravels and cobbles. First-encountered native soils in the southern portion of the Site correlate with gravelly or sandy silty clays. The remainder of the Site is dominated by deposits of dissected and discontinuous interbedded sands, gravels, and clay units. The hydraulic conductivity of the dredge tailings and fill is approximately  $10^{-2}$  centimeters per second, greater than that of typical native soils ( $10^{-5}$  centimeters per second) (EPA, 1996).

Fresh groundwater occurs in the gravels of the Laguna Formation throughout the Site and in the Mehrten Formation in some locations. The groundwater aquifer of the Ione Formation is brackish and saline and is separated from overlying freshwater aquifers by low-permeability clays. Perched groundwater exists scattered throughout the Site in variable locations.

The regional A-zone aquifer is above the water table on property and, thus, is not present as an aquifer unit. The A-zone aquifer is noted south of the property within the gravel layer of the Laguna Formation. The B-zone aquifer is subdivided into the upper B and lower B, due to discontinuous shallow clay ranging from 50 to 80 feet bgs. The B and C aquifers are divided by a discontinuous middle clay zone at approximately 125 feet bgs, and the C aquifer extends to the irregular discontinuous Ione Formation silty clay layer at approximately 165 feet bgs. Interbedded clays within the Laguna and Mehrten Formations form discontinuous aquitards and create confining conditions. On a sitewide scale, the upper B, lower B, and C aquifers are interconnected; however, in some portions of the Site, they are locally vertically separated by competent clay layers (HSI Geo Trans, 1999b; see Figure 3).

Groundwater flow direction is to the south at an average velocity of 500 feet/year. The hydraulic gradient ranges from 0.001 to 0.004 foot/foot and is somewhat higher on property

compared with that off property (HSI Geo Trans, 1999b). There is an extensive monitoring well network on and off property (see Figures 4 and 5).

Vertical gradients are variable on and off property. On property they are influenced by extraction well pumping of extraction wells EW-1 and EW-2 to the treatment system. Off property there are upward vertical gradients in the vicinity of RI-4/-14 and downward in the location of RI-7/-13 and R1-11/-12 (Dames and Moore, 1988).

### **3.2 Land and Resource Use**

Land use near the Site is a mixture of residential, industrial, commercial, and agriculture. Rural homeowners on 1 to 5 acres of land commonly raise livestock and grow produce for home use. Residential areas are to the south, southeast, west, and northeast of the Site. Three schools are within a 2-mile radius of the Site (EPA, 1989). Two National Priorities List sites were in the vicinity of Koppers: the former L-P Lumber Mill west of the Site and the Western Pacific Railyard, northeast of the Site. The former L-P Lumber Mill was delisted in 1996, and the Western Pacific Railyard was delisted in 2001. West of the Feather River is public open space, the Oroville Wildlife Area (Dames and Moore, 1988).

### **3.3 Overview of Historical Activities at the Site**

Mine dredging operations occurred throughout the region in the 1900s, resulting in remnant tailings in portions of the Site. Contaminants discovered on property have not been found to be related to the dredge tailings. Wood treating operations, intended to prevent wood from deterioration by insects or fungi, were conducted at the Site from 1948 to 2001. Wood treating operations resulted in RCRA hazardous wastes (40 CFR 261), California hazardous wastes (CAC Title 22), and/or nonhazardous wastes which may contain wood treating chemicals. The wood treatment process involved the use of chemical preservatives such as PCP from 1948 to 1988, creosote sludges, and chromated copper arsenate solution. The cellon process used PCP in isopropyl ether (IPE) and butane to treat wood. The non-com exterior process, discontinued in 1986, used chemicals containing formaldehyde and dicyandiamide. Other chemicals historically used at the Site include creosote, naphthalene, boron, phosphorous, diesel oil, and gasoline (Dames and Moore, 1988).

Chemicals were released to the environment through waste disposal practices, spills, fires, products dripping from treated wood, and storage and handling practices. From approximately 1952 to 1973, unlined creosote settling ponds located west of the former process area were used as evaporator basins for process residuals. Occasionally the creosote pond overflowed to a marsh area southwest of the L-P ditch (Dames and Moore, 1988; HSI Geo Trans, 1999b). Upon discontinued use, this area was later backfilled with soil and dredge tailings. From 1961 to 1973, the cellon process released residual wastes across approximately 1 acre near the western site boundary (Dames and Moore, 1988). From 1963 to 1973, wastewater from a pole-washing unit at the northern portion of the Site was not contained and was released just south of the pole washer. In 1963, a fire occurred at the Site resulting in a release of 20,000 gallons of PCP, and the cellon process plant was destroyed. Combustion of PCP produced PCDDs/PCDFs. The debris from the fire was buried on property (Dames and Moore, 1988). There was another fire at the Site in 1987. Debris from the 1963 fire was initially buried on property, but was subsequently removed and disposed of offsite under a Water Board order (HSI Geo Trans, 1998).

### 3.4 Initial Response

PCP-contaminated groundwater was first identified on property in 1971, and identified the following year off property in residential drinking water supply wells to the southwest of the Site. In 1973, Koppers installed a biological wastewater treatment unit for all process residuals, therefore ceasing discharge to the unlined areas. In 1974, Koppers installed and began operating two groundwater recovery wells (RW-1 and RW-2). Groundwater was extracted from these wells and discharged on property via irrigation (spray fields) to inhibit plume migration. The RWQCB issued a Cease-and-Desist order to Koppers in 1982, directing Koppers to end discharge of PCP into the soil and prepare a work plan detailing (1) activities to mitigate damage caused by offsite contaminants to the southwest, (2) process changes needed to prevent additional contamination, and (3) alternatives for treating excavated soils. In 1984, Koppers began supplying bottled water to 45 residences and completed a Phase I and Phase II hydrogeologic groundwater investigation. Results indicated a plume of PCP, PAHs, and IPE moving southwest.

In 1984, the Site was placed on the National Priorities List, and the following year groundwater monitoring was initiated at the Site. During 1986, Koppers signed a Consent Order with the EPA, agreeing to conduct the remedial investigation and feasibility study. Down-gradient residences with PCP-impacted drinking water supply wells were connected to an alternate water supply, the Oroville-Wyandotte Irrigation District, in 1986. The 1987 fire at the Site resulted in EPA issuing a unilateral removal order for the cleanup, removal, and stabilization of impacted soils. To prevent spills from ongoing operations, a temporary cap was constructed over the process area in 1987, and replaced with concrete drip pads during 1992.

The remedial investigation and endangerment assessment were completed in 1988 (Dames and Moore, 1988). Later that same year, Beazer sold the Site to KII, yet Beazer retained all CERCLA responsibilities. During 1989, the feasibility study was completed, followed by the ROD. Beazer signed a Consent Decree in 1992, agreeing to perform remedial action under Superfund at the Site. The property owner, KII, continued to operate the wood treating facility under RCRA requirements.

### 3.5 Basis for Taking Action

Table 3-1 identifies contaminants of concern (COC) (hazardous substances, pollutants, and contaminants) that have been released at the Site to respective units (considered to encompass one operating unit) as designated by the ROD, ESD, and ROD Amendments (1 and 2).

The information relating to Site risks is taken from the endangerment assessment (ICF Clement, 1988). The resulting 1989 ROD-selected, risk-based cleanup standards for Site constituents in soil and groundwater were based on future residential use of the Site. ROD Amendment No. 1 revised the soil cleanup standards to be based on continued industrial use of the site.

The primary human health risk posed by the Site is the potential for direct or indirect ingestion of contaminated groundwater and inhalation or ingestion of contaminated soil. At the time the endangerment assessment was conducted, an alternate drinking water supply was

in place; therefore, the endangerment assessment did not assess direct ingestion of groundwater at the contaminant levels that were then current.

**Table 3-1: Estimated Quantities of Contaminated Media**

Unit Designation	Chemicals of Concern	Area	Volume of Contaminated Media <sup>a</sup>
Soil: S1	PCP and PCDDs/PCDFs	Former pole-wash area and areas along the drip track leading to the process area, areas east and south of the process area, the fire debris site at the eastern side of the western spray field, and the surface soils throughout the treated wood transport areas.	91,730 cy
Soil: S2 (includes TI zone <sup>b</sup> )	Present as dense nonaqueous-phase liquids (DNAPLs): PCP, PAHs, PCDDs/PCDFs <sup>b</sup> , carcinogenic PAH <sup>b</sup>	Former creosote pond and cellon blowdown areas, an area of creosote-contaminated soil along the L-P ditch, and sediments in offsite drainage ditches and ponds southwest of the Site.	24,400 cy
Soil: S3	PCP, PAHs, metals	Wood treating process area.	34,200 cy
Soil: S4	Metals (arsenic, chromium, and copper)	East and south of the process area, where wood treated with metals has been stored.	2,900 cy
Off-property groundwater	PCP and IPE	South of Baggett-Marysville Road.	300,000,000 cubic feet <sup>c</sup>
On-property groundwater	PCP, IPE, PAHs, metals (arsenic and chromium)	North and west of Baggett-Marysville Road.	84,000,000 cubic feet <sup>c</sup>
Drums of debris from 1987 fire, soil filter bed of the Biological Treatment Unit, and sediments in the fire pond	Not defined	Drums of debris from 1987 fire, soil filter bed of the Biological Treatment Unit, and sediments in the fire pond.	6,700 cy
<p><sup>a</sup>These quantities are estimates and were actually significantly reduced based on the ESD, which allowed for minimal excavation below 5 feet. Actual excavation volumes were also reliant on field sampling results (TRC, 1999 and personal communication, 2002).</p> <p><sup>b</sup>Groundwater remedy.</p> <p><sup>c</sup>Identified in ROD Amendment No. 2 (EPA, 1999).</p>			

## 4.0 Remedial Actions

The following sections summarize the remedial actions selected, as well as the implementation, operation, and maintenance of remedial systems.

The ROD for the Site was signed on September 13, 1989. The selected remedy presented in the ROD addressed the following six separate units that collectively encompass one sitewide operating unit:

- S1: Soils within the former pole-wash area and areas along the drip track leading to the process area, areas east and south of the process area, the fire debris site at the eastern side of the western spray field, and the surface soils throughout the treated wood transport areas
- S2: Soils within the former creosote pond, cellon blowdown areas, an area of creosote-contaminated soil along the L-P ditch, and sediments in offsite drainage ditches and ponds southwest of the Site
- S3: Soils within wood treating process area
- S4: Soils located east and south of the process area, where wood treated with metals was stored
- On-property impacted groundwater
- Off-property impacted groundwater

The selected remedies, as stated in the ROD and ROD Amendments, are intended to reduce contamination to health-protective levels consistent with potential future industrial exposure with the exclusion of Unit S3. The ROD mandated that S3 must be addressed when the area became accessible, preferentially when operations ceased at the Site. Remedies selected for groundwater are intended to restore the groundwater to a condition that will enable its safe use as a public domestic water supply to residents affected by contaminated groundwater. This decision document also formalized the provision of sufficient volume of an alternate water supply to those affected by the contamination until remedial objectives are met (EPA, 1989).

### 4.1 Groundwater

The following section outlines remedial actions implemented in compliance with the ROD, Consent Decree, and ROD Amendment No. 2 pertaining to on-property and off-property groundwater contamination at the Site.

#### 4.1.1 On Property

A product recovery well, PR-1, was installed adjacent to the former creosote pond in Unit S2 during 1994 for DNAPL recovery (see Figure 6). Despite source removal, it was concluded that continued operation of the onsite groundwater remedial system would not decrease contaminant concentrations within the creosote pond and cellon blowdown area, where a significant mass of DNAPL of creosote and creosote emulsion exists over an area of

approximately 4 acres (Figure 6). As a result, ROD Amendment No. 2 was issued in September 1999, which modified the groundwater remedy for on property to provide for the following:

- A 4-acre TI zone, including the area of the former creosote pond and cellon blowdown areas
- Adding enhanced *in situ* bioremediation as a groundwater remedy
- Providing monitored natural attenuation as a contingency remedy
- Revising groundwater standards for PCP from 2.2 to 1.0 ppb and for barium from 680 ppb to 1,000 ppb

Major components of the TI waiver included the following:

- Sampling for chemicals of concern within the TI zone and downgradient
- Installation of a new well downgradient of the TI zone for monitoring
- Implementation of institutional controls, primarily a deed restriction, intended to prevent exposure to impacted groundwater by not allowing the installation of drinking water supply wells, thereby inhibiting groundwater use on property
- Continuation of product recovery at PR-1 and PAH *in situ* bioremediation at well BW-1 until the creosote recovery at well PR-1 is less than 1 gallon per year

Groundwater sampling for each COC within the TI zone and downgradient has continued on and off property since 1985. Frequency of sampling is dependent upon the location and contaminant history. A new monitoring well downgradient of the TI zone has not yet been installed, and is not required until 1 year prior to the shutdown of the on-property treatment system.

According to the Technical Impracticability Waiver outlined in ROD Amendment No. 2, the following will apply to the on-property pump-and-treat facility:

- Six months prior to placing the pump-and-treat facility on standby reserve, a detailed contingency plan will be submitted to EPA for approval.
- The TI zone contingency plan will describe activities necessary to maintain the on-property pump-and-treat facility in good working order with the ability to resume normal operations within 1 month of determination that any COC is leaving the TI zone (pump-and-treat operations must resume if 95 percent of the upper confidence limit of the mean for four consecutive sampling events for a COC exceeds the ROD standard).

The language of the deed restriction has been approved by DTSC but is still under negotiation; completion is expected by August 2003.

Product recovery is continuing at PR-1 and monitored every 2 weeks. Recovery is greater than 1 gallon per year (approximately 146 gallons during 2001); therefore, this remedial action continues. *In situ* bioremediation ceased at well BW-1 in June 2001, because monitoring data indicated treatment had resulted in an apparent increase in mobility of PAHs. Currently, treatment in the TI zone is being re-assessed.

The ROD Amendment No. 2 stipulated the following for enhanced *in situ* bioremediation of PCP on property:

- Nutrient addition (oxygen, nitrogen, phosphorus) to onsite wells with downgradient monitoring
- Continued operation of onsite groundwater extraction and treatment system
- Annually evaluate and enhance program accordingly

The onsite *in situ* bioremediation program of the eastern PCP plume began in March 1998. Oxygen-releasing compounds and di-ammonium phosphate additions are made to monitoring wells MW-1, MW-4, MW-6, MW-12, MW-13, and MW-23 on a quarterly basis. Downgradient monitoring wells corresponding to these *in situ* bioremediation locations are MW-3, MW-5, MW-7, MW-8, and TW-1.

Performance and results of the enhanced *in situ* bioremediation program are reported annually in the Annual Remedial Action Groundwater Monitoring Report, and future recommendations are provided.

The onsite groundwater remediation system began treating groundwater extracted from two wells, EW-1 and EW-2, in February 1994. The system is designed to pump 200 gallons per minute (gpm) from each well for a combined capacity of 400 gpm, and to treat groundwater with air stripping and granulated activated carbon. Remediated groundwater is re-injected into the aquifer through injection wells IW-3 and IW-4. The onsite groundwater remediation system is currently operating and has treated more than 1.6 billion gallons of water to date (HSI Geo Trans, 2002).

Monitored natural attenuation has not been implemented at the site. This remedy was approved as a contingency on the basis of the following criteria, which have not yet been met at the Site:

- The intended effects of enhanced *in situ* bioremediation, a reduction of PCP concentrations in groundwater to below the ROD standard, are not adequately achieved
- It is proven that other active restoration measures are not necessary
- Site data indicate that PCP degradation is occurring
- Within a reasonable timeframe, natural attenuation is expected to achieve cleanup levels similar to that of a treatment remedy

#### **4.1.2 Off Property**

Beazer continues to provide an alternate water supply for seven affected residences. Five residences have impacted wells near the residual off-property plume, and two residences are near well 86, which has shown periodic PCP readings. *In situ* bioremediation is being used to remediate the contained residual off-property groundwater plume. Monitoring is being conducted for comparison against ROD-selected standards to gauge remedial performance.

The off-property groundwater remedial system began operation in March 1993. This system includes two extraction wells, EW-3 and EW-4, designed to pump at 300 gpm each for a combined capacity of 600 gpm. Groundwater was filtered and treated with granulated activated carbon to remove PCP and other ROD constituents. During operation, the remediation system extracted a total of 626,578,940 gallons (HSI Geo Trans, 2002). This system was taken offline in December 1995, because the original plume retreated north, and the system was located too far downgradient to capture PCP-impacted groundwater to the north.

The ROD Amendment No. 2 stipulated the following for enhanced *in situ* bioremediation off property:

- Nutrient addition (oxygen, nitrogen, phosphorus) to offsite wells with downgradient monitoring.
- Annual evaluation and enhancement of the program accordingly.
- Well RI-11 was proposed for nutrient addition; therefore, alternate water supply termination criteria were modified for wells 59, 60, 61, 62, and 81 (EPA, 1999). PCP verification sampling for these wells cannot take place until nutrient addition at RI-11 has ceased for 1 year to allow for the return of background levels. After this time, if PCP concentrations are less than 0.5 ppb for four consecutive quarters, then the use of the alternate water supply can cease.

The revised offsite *in situ* bioremediation program began in August 1998. A total of 13 additions of oxygen-releasing compounds and di-ammonium phosphate have been made to wells 26, RI-11, and RI-20A. Downgradient monitoring points corresponding to these locations include RI-2, RI-10, RI-12, and RI-16B. Residential owners of wells 59, 60, 61, 62, 81, 31C2, and 31D3 continue to be provided with an alternate drinking water supply.

## 4.2 Soil

The following section outlines soil remedial actions implemented in accordance with the ROD, subsequent ESD, and ROD Amendment No. 1. An ESD was formalized in January 1991, which limited soils remediation to 5 feet unless a potential contaminant source to groundwater was determined. Two concrete drip pads were installed in the process area in 1992 for Unit S3, to prevent treated product from contaminating soil.

In 1995 and 1996, two soil disposal cells, Cell No. 1 and Cell No. 2 (RCRA-designated Class I landfills), were constructed on property (see Figure 7). Both landfills are double-lined with 60-mil flexible membrane, contain leachate monitoring equipment, and are equipped with unsaturated zone monitoring apparatus. Three groundwater monitoring well pairs in the vicinity of Cell No. 1 and two well pairs in the vicinity of Cell No. 2 are routinely sampled for chemicals of concern.

While conducting the field bioremediation treatability study in 1993, PCDDs/PCDFs (dioxins) above industrial standards for workers, as per the ROD, were detected in onsite surface soils. A soil removal action was ordered by EPA, and the soil was excavated and disposed of in Cell No. 1 in 1995. This removal action included soil from the former pole-wash area.

The following ROD-selected soil remedies were investigated:

- A treatability study for soil washing was conducted in 1992 to 1993 for Unit S2.
- A soil fixation treatability study was completed in 1994 for Unit S4.
- Laboratory soil bioremediation treatability studies of carcinogenic PAHs and PCP were completed during 1992 and 1994 for Unit S1.

Results from the treatability tests for soils showed that ROD-selected technologies were not capable of reducing contaminant levels to less than ROD-selected standards for residential land use, particularly given the widespread dioxin contamination discovered in 1993. ROD Amendment No. 1 was issued for the Site in August 1996. The amendment changed the soil remedy to an onsite landfill and soil cleanup standards from residential to industrial, thus requiring deed restriction on the property. ROD Amendment No. 1 also addressed the following areas not included in the ROD: drums of debris from the 1987 fire, the soil filter bed of the Biological Treatment Unit, and sediments in the fire pond.

In compliance with ROD Amendment No. 1, all excavations have been completed, including the former process area, as outlined in Table 4-1. Locations are detailed on Figure 7. Soil excavation commenced in the former process area during June 2002, formerly designated as Unit S3 in the 1989 ROD (later named Area 8C). The process area soil cleanup was completed in September 2002. All excavated soil from this area was disposed of in Cell No. 2, and the final cap was constructed in accordance with approved work plans.

**Table 4-1: Summary of Soil Removal and Remedial Actions from 1995 through 2002<sup>a</sup>**

Area	Description	Soil Removal Period	Approximate Volume of Soil Removed (cy)	Location of Soil Disposal
Removal Action (Part of 5 and 7e)	Part of Former Pole Washer Area and Former Log Drying Area	1995	13,000	Cell No. 1
1	Former Biological Treatment Facility	1996	21,000	Cell No. 2
2	Soil Storage Building	1996	3,100	Cell No. 2
3	Fire Debris Storage Area	1996	600	Cell No. 2
4	Former Creosote Pond and Cellon Blowdown Area	1996-1997	20,500	Cell No. 2
5	Former Pole Washer Area (remainder)	1997	4,830	Cell No. 2
6a	Former Drip Track Area	1997	15,200	Cell No. 2
6b	Former Drip Track Area	1997		Cell No. 2
7a	Former Log Drying Area	1997	28,300	Cell No. 2
7b	Former Log Drying Area	1997		Cell No. 2
7c	Former Log Drying Area	1996-1997		Cell No. 2
7d	Former Log Drying Area	1997		Cell No. 2
7e	Former Log Drying Area (remainder)	1997		Cell No. 2
8a	Former Process Area	1997	41,000	Cell No. 2
8b	Former Process Area	1997		Cell No. 2
8c	Former Process Area	1997 and 2002		Cell No. 2
8d	Former Process Area	1997		Cell No. 2
9	Fire Water Pond	1997	3,600	Cell No. 2
10	Biological Test Plots	1997	1,800	Cell No. 2
	Dri-Con Area	2002	6,000	Cell No. 2
	Miscellaneous Materials from KII RCRA Closure	2002	1,000	Cell No. 2
	Miscellaneous Materials from KII Resource Conservation and Recovery Act Closure	2002	1,000 159,930	13,000 cy in Cell 1 146,930 cy in Cell 2
<sup>a</sup> TRC 1999, and personal communication, 2002.				

## **5.0 Progress Since Last 5-year Review**

The first 5-year review for this site was completed in December 1997. This document identified one outstanding issue and recommended status updates of specific remedial actions during the second 5-year review.

The outstanding item noted during the first 5-year review was a deed restriction for the Site as industrial, and property bounded by Landfill Cells 1 and 2 be deeded to remain the responsibility of the potentially responsible party. Beazer acquired the property on November 5, 2002, and the language of the on-property deed restriction is currently being finalized. Completion of the deed restriction is estimated for August 2003.

The first 5-year review recommended that during the second 5-year review the status of the off-property groundwater plume degradation, effectiveness of on-property groundwater containment, and available access to the process area soil be addressed. All of these items are addressed in detail in Section 4.0 of this report.

## **6.0 5-year Review Findings**

The following sections discuss findings from the 5-year review.

### **6.1 5-year Review Process**

The Koppers Company, Inc., 5-year review was led by Charles Berrey, the EPA Remedial Project Manager for the Site. EPA received technical support from CH2M HILL.

The 5-year review consisted of a review of relevant documents (Appendix A) and a regulatory review (Appendix B). A site inspection was not conducted because there is an ongoing Agency presence at the Site.

Following the release of this document, EPA will produce and distribute a fact sheet to the community near the Site. The fact sheet will summarize the findings of the 5-year review and instructions on how to access a copy of the review.

#### **6.1.1 Interviews**

Interviews were not conducted as part of this review. Over the past 15 years, EPA has issued at least one fact sheet to the community annually except for year 2000. Based on past lack of public interest at the 1996 and 1999 public meetings held in Oroville to solicit input on the proposed ROD Amendments, the EPA did not conduct citizen interviews for the 5-year review. The EPA did place an advertisement in the local paper seeking community input and sent a fact sheet to the community updating them on the 5-year process and how to provide comments. Comments received over the past 3 years have expressed concern with the high cancer rates in the Oroville area, but no concern has been expressed concerning the remedy implementation at the Koppers Site.

#### **6.1.2 Document Review**

As a part of the 5-year review process, CH2M HILL conducted a brief review of numerous documents related to Site activities. The documents chosen for review primarily focused on actions that have occurred during the past 5 years, but ranged in publication date from 1988 to the present. Appendix A provides a list of the documents cited in this report.

### **6.2 Regulatory Review**

This section provides a review of applicable or relevant and appropriate requirements (ARARs) and other standards to be considered (TBC) for the selected remedy at the Koppers Company, Inc., Superfund Site. ARARs are standards and other substantive environmental protection requirements promulgated under federal and state law with which the remedial actions at a site must comply. TBCs are non-promulgated federal or state advisories or guidelines that are not legally binding and do not have the status of ARARs. However, TBCs may play an important role in the development of site-specific cleanup standards.

As part of the 1996 and 1999 ROD Amendments, a review of ARARs was conducted for groundwater cleanup levels at the Koppers Site. Based on that review, the ARARs were modified in the ROD Amendment in the following three respects: (1) the modified

groundwater remedy required a waiver of all ARARs within the defined TI zone, (2) new remedial activities required the adoption of additional action-specific ARARs, and (3) the ROD Amendment incorporated newly promulgated requirements for barium and PCP that were necessary to ensure the protectiveness of the selected remedy.

The EPA has waived the ARARs that apply to the TI zone because it is technically impracticable, from an engineering perspective, to meet the standards. See CERCLA Section 121(d)(4)(c), 42 U.S.C. Section 9621(d)(4)(c). Additionally, EPA determined that the federal and state maximum contaminant levels (MCL) for barium and PCP had changed. These revised MCLs were adopted as cleanup standards under the 1999 ROD Amendment. No other changes were made to the 1989 ARARs as a result of the ARAR review conducted in association with 1999 ROD Amendment. The ROD Amendment did not affect the ARARs selected for the soil remedy (EPA, 1996).

Based on the ARARs review presented in Appendix B, there have been no changes in ARARs that would warrant modification of the cleanup levels or other requirements contained in the 1999 ROD Amendment or the 1996 ROD for soils. Groundwater cleanup goals contained in the ROD that are based on reduction of human health risk, or TBC criteria (i.e., not based on ARARs) include numerical concentration targets for IPE, boron, Toxic Equivalent 2,3,7,8-tetrachlorobibenzo-p-dioxin (TCDD), the dioxin equivalents, and PAHs. No ARARs were identified that are more stringent than the current cleanup levels for these compounds contained in Table B-2 in Appendix B. Likewise, risk-based soil remediation goals for TCDD and PAHs that were developed as part of the 1989 ROD have not changed because there are no ARARs that warrant a change in these levels. Groundwater cleanup goals for arsenic, discussed further below, are based on the TBC criteria of background.

Groundwater cleanup goals for PCP, boron, and chromium are based on MCLs promulgated under the Safe Drinking Water Act, which is an ARAR.

On January 22, 2001, EPA adopted a new standard for arsenic in drinking water at 10 ppb, replacing the old standard of 50 ppb. The rule became effective on February 22, 2002. The date by which drinking water systems must comply with the new 10 ppb standard is January 23, 2006.

The new MCL for arsenic is less than half the site background concentration. The Water Quality Control Plan for the Sacramento and San Joaquin River Basins of September 15, 1998, expressly states that its water quality objectives do not require improvement over naturally occurring background concentrations. The background concentration for arsenic of 27 ppb will continue to be the cleanup standard for groundwater at the Koppers Site.

In addition to the chemical-specific ARARs summarized above, the action-specific and location-specific ARARs contained in the 1996 ROD amendment were reviewed to determine if requirements had been changed or updated. Based on our review, none of these ARARs have been changed or updated in a way that would impact the current remedial actions. A complete list of action-specific and location-specific ARARs is provided in Table B-3 of Appendix B.

## 7.0 Technical Assessment

### 7.1 Functioning of the Remedy as Intended by Decision Documents

All remedial actions pertaining to soil, as mandated in the ROD, ESD, Consent Decree, and ROD Amendment No. 1, have been implemented. The soil removal action at the former-process Area 8C was initiated in June 2002, following closure of the wood treating facility, and was completed in September 2002. These remedial actions include onsite disposal of all excavated soils into Cell No. 1 or Cell No. 2, designated as Class I landfills. The objective of the selected soil remedies was to reduce contamination to health-protective levels consistent with potential future industrial exposure. Field observations and confirmation sampling during soil removal were conducted in accordance with the approved Remedial Action Work Plan. As of December 2001, there were no recorded changes in settlement monuments near the disposal cells, and the only chemical of concern detected in monitoring points was copper in the shallow aquifer at concentrations less than background (HSI Geo Trans, 2002). Remedial actions completed to date pertaining to this remedy are functioning as intended by the applicable decision documents.

In compliance with the ROD and Consent Decree, Beazer continued to provide sufficient quantities of an alternate water supply for downgradient residences with PCP-impacted drinking water supply wells. As of December 2001, five residences with private wells in the vicinity of RI-11 (59, 60, 61, 62, and 81), plus wells 31C2 and 31D3, remain in the alternative water supply program. Removal from the program is contingent upon meeting alternate water supply termination criteria, which is not anticipated until cessation of *in situ* bioremediation at RI-11. Additionally, the following wells are sampled on a regular basis: 31C2, 31D3, 31C1, and well 86. Remedial actions pertaining to providing an alternative drinking water supply are functioning as intended by decision documents.

The off-property groundwater remedial system operated from March 1993 to December 1995. This system was taken offline because the original plume retreated north, and the system was located too far downgradient to capture off-property PCP-impacted groundwater to the north. Monitoring data do not indicate that any contaminants would be captured by extraction from wells EW-3 or EW-4. Offsite *in situ* bioremediation is functioning as a replacement remedy for the remedial system.

Remedial actions within the TI zone are functioning as intended by the decision document where implemented; however, there has been some delay in implementation of certain aspects. Groundwater sampling for chemicals of concern within the TI zone and downgradient has continued on and off property since ROD Amendment No. 2. Frequency of sampling is dependent upon the location and contaminant history. The initial long-term pilot bioremediation system was initiated in July 1995, and terminated in June 2001, when it was observed to increase the mobility of PAHs. Installation of a new monitoring well downgradient of the TI zone (required 1 year prior to shutdown of on-property treatment system) may provide a more comprehensive conclusion.

A proposed downgradient treatment of the TI zone was rejected by EPA in June 2002, because it would do nothing to provide source reduction.

The language of the deed restriction is still under negotiation; completion is expected by June 30, 2003. Product recovery is continuing at PR-1 and monitored every 2 weeks. Recovery is greater than 1 gallon per year (approximately 146 gallons during 2001); therefore, this remedial action continues and is functioning as intended.

The onsite *in situ* bioremediation program of the eastern PCP plume continues with oxygen-releasing compounds and di-ammonium phosphate additions to wells MW-1, MW-4, MW-6, MW-12, MW-13, and MW-23 on a quarterly basis. Monitored downgradient wells corresponding to these *in situ* bioremediation locations are MW-3, MW-5, MW-7, MW-8, and TW-1 (see Figure 8). Concentration trends in these wells overall indicate stabilization in PCP trends. Recent detection of increased PCP in well MW-8 to 780 ppb and boron at 2,450 ppb is attributed to historical activities at the Dri-Con/CCA Tank Area. The short-term Dri-Con/CCA Tank Area remedy extracts groundwater from well MW-8 and blends the extracted water with the influent at the on-property groundwater treatment system. An ongoing evaluation will bear out whether boron treatment is required or additional PCP control is needed based on downgradient monitoring of wells 86, 31C1, 31C2, and 31D3.

The offsite *in situ* bioremediation program continues with oxygen-releasing compounds and di-ammonium phosphate additions made to wells 26, RI-11, and RI-20A on a quarterly or semi-annual basis. Downgradient monitoring points corresponding to these locations include RI-2, RI-2, RI-10, RI-12, and RI-16B. Concentration trends in these wells indicate a decreasing trend in PCP except for an anomalous detection in well RI-12 during November 2000 (0.66 ppb) (see Figure 9). It is difficult to evaluate the effectiveness of the on- and offsite *in situ* bioremediation program given the limited number of downgradient sampling points and their location with respect to the injection point. Additionally, effectiveness should not be evaluated on PCP concentration alone. At this time, this remedy appears to be functioning as intended by the decision-making document; however, additional downgradient monitoring points are recommended to increase data capture and decision-making abilities.

The onsite groundwater remediation system continues to treat groundwater extracted from EW-1 and EW-2. The system is pumping at optimum rates with minimal shutdown time due to maintenance. Influent PCP concentrations have decreased over time to 5.2 ppb (May 2002). Injection wells IW-3 and IW-4 are functioning optimally (HSI Geo Trans, 2002). The increase in PCP concentration in well 86 is being monitored to verify that EW-1 and EW-2 are adequately capturing the plume in Sub-unit A.

## **7.2 Current Validity of Assumptions Used during Remedy Selection**

The assumptions used to implement the remedy are generally unchanged from the time of selection for all areas contaminated with chemicals identified at the time of the 1989 ROD, the ESD, and the two ROD Amendments, 1996 and 1999, respectively. However, a new federal MCL for arsenic of 10 ppb was adopted on January 22, 2001. This MCL is less than half the Site background concentration of 27 ppb. Because the Water Quality Control Plan for the Sacramento and San Joaquin River Basins expressly states that its water quality objectives do not require improvement over naturally occurring background concentrations, the cleanup standard for Koppers Site of 27 ppb will not change.

### **7.3 Recent Information Affecting the Remedy**

Two detections at the Site should be considered in decision making. The first is that there have been periodic increases in PCP concentration in well 86 (A-Zone), reportedly related to groundwater elevation increases in the A-Zone. Currently, well 86 and downgradient A-Zone well 31C1 are monitored monthly for water levels, and quarterly for water quality to verify the plume is being captured. If an exceedance of PCP ROD standards is ever detected in 31C1, this would trigger the need for further action. At the time of this review, the on-property extraction system is considered protective.

In addition, the recent discovery of boron in soil and groundwater in the vicinity of well MW-8 was addressed during site closure activities. (Boron was used as part of the proprietary Dri-Con process. The boron was present in soil beneath a tank that was removed during the RCRA closure in the summer of 2001. Surface water penetrated the ground surface at the former tank location during the winter of 2001-2002 and resulted in a high concentration of boron in groundwater in 2001 and 2002.) DTSC provided oversight for the RCRA closure activities.

The boron-contaminated soil was removed and placed in Disposal Cell No. 2. MW-8 has been converted to an extraction well. The extracted water is diluted and then processed at the on-property treatment plant. This has been adopted as a temporary remedy for this problem. All effluent standards are currently being met. Groundwater monitoring will be used to confirm the success of this interim remedy and will determine if long-term treatment modifications are required.

## 8.0 Conclusions and Recommendations

The following sections summarize conclusions and recommendations from the 5-year review. Where follow-up action is required, the follow-up action to be conducted and the proposed date for completion are discussed.

### 8.1 Issues Identified and Recommended Follow-up Actions

Outstanding issues identified during the 5-year review process include lack of implementation of remedial actions mandated in ROD Amendment No. 2, and new information or circumstances affecting the remedies. These issues and recommended follow-up actions are summarized in Table 8-1.

The ROD Amendment No. 2 included as a part of remedial action requirements for the off-property treatment system that a deed restriction be developed. Currently, the language for the on-property deed restriction is under negotiation and anticipated to be completed by August 2003.

New information influencing the 5-year review includes two unanticipated contaminant detections at the site as remedial action has progressed. One of these is the increased concentration of PCP in well 86 to greater than the ROD standard since 2000. Recommended follow-up action for well 86 includes ongoing evaluation of groundwater monitoring chemical and hydraulic data, particularly based on downgradient monitoring of wells 86 and 31C1 to confirm plume capture by the on-property groundwater extraction system. Detection of PCP exceeding the ROD standard will be the trigger for additional follow-up actions.

The second unanticipated contaminant detection is boron in groundwater from well MW-8 and soil in the vicinity. Boron was initially detected in soil and groundwater during the fourth quarter of 2001 in the vicinity of well MW-8 (see Figure 10). Boron in soil was addressed during the Area 8C remedial construction (August to September 2002) and is being monitored in groundwater to confirm the success of the removal action. Currently, extraction, dilution, and diversion to the on-property treatment plant has been adopted as a short-term remedy for boron in groundwater. Recommended follow-up actions include evaluation of the hydraulic effects of extraction at well MW-8 and the chemical concentration of boron in groundwater (influent concentration) to ensure that the current technologies are effective. An ongoing evaluation will determine whether additional follow-up actions are required. Currently, the protectiveness of the remedy is not compromised.

New circumstances, primarily the limited number of downgradient groundwater monitoring points in relation to the on- and off-property *in situ* bioremediation program and their location with respect to the injection point, make it difficult to evaluate the effectiveness of this remedial program. At this time, additional downgradient monitoring points are recommended to increase data capture and decision-making abilities.

Issues identified during the document review are with regard to the Annual Groundwater Monitoring Report. Specifically, the TI zone should be included on all Site figures, given the significance of this area as a potential source of contamination. Additionally, consideration should be given to the scale of the concentration versus time plots; a log scale is recom-

mended because of the large reductions in concentrations since monitoring was initiated in 1985. Concentration trends following the commencement of the *in situ* bioremediation program could be better evaluated as a result.

**Table 8-1: Issues Identified and Recommended Follow-up Actions**

<b>Issue</b>	<b>Recommendations / Follow-up Action</b>	<b>Party Responsible</b>	<b>Milestone Date</b>	<b>Does the Issue Affect Current Protectiveness?</b>
A deed restriction is not yet in place for the on-property portion of the Site	Continue negotiations on the wording of the deed restriction	Beazer, DTSC, EPA	August 2003	No
Annual review of technology of PAH remediation	To be conducted once per year	EPA, Beazer	By April of every year	Possibly
Ongoing semi-annual and annual evaluation of monitoring data in Groundwater Monitoring Report	To be conducted twice annually	EPA, Beazer	April and October of every year	Possibly
<i>In situ</i> bioremediation within the TI zone on property ceased in June 2001	Evaluation of viable alternatives as necessary	Beazer	Annually (April), at a minimum until data suggests otherwise	No
Seven drinking water supply wells remain on an alternative drinking water supply source	Continue to supply alternative water and monitor COC concentrations in wells	Beazer	Annually (April), until data suggests otherwise	No
Increased concentrations of PCP in well 86	Continue to evaluate concentrations and groundwater levels in wells 86 and 31C1 monthly	Beazer	Monthly until data indicates otherwise	Yes
Modifications to the Groundwater Monitoring Report	Implement modifications to concentration versus time plots and include the TI zone on all Site maps	Beazer	April 2003	No
Increase in boron concentrations in groundwater at well MW-8	Continue to extract groundwater from this well and treat with the on-property treatment system; evaluate boron concentration of influent regularly	Beazer	December 2003, or until EPA approves alternative approach	Yes

## 9.0 Protectiveness Statements

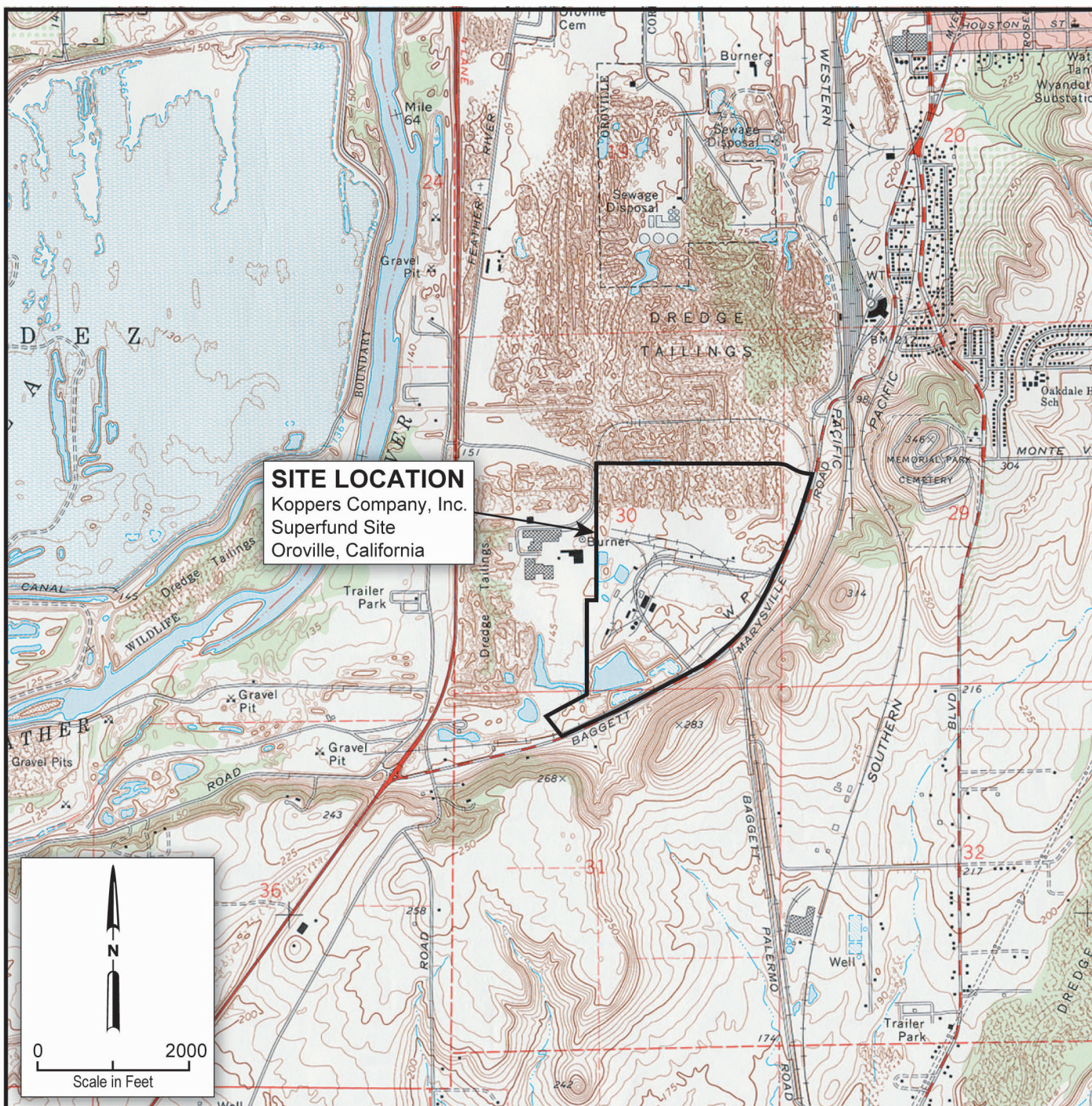
This Site requires ongoing 5-year reviews to ensure that protectiveness is not compromised. With regard to the on-property portion of the Site, including the TI zone, institutional and access controls are in place and effective in preventing exposure. The existing groundwater control/interception system is being operated to its full extent. An interim remedy that addresses boron contamination is in place and is fully protective. A long-term Boron Remediation Work Plan will be submitted in early 2003 for Agency review.

With respect to the off-property portion of the site, the *in situ* bioremediation is operating and is fully protective.

The remedies for the operable unit at KII are protective of human health and the environment, and in the interim, exposure pathways that could result in unacceptable risks are being controlled.

The next review will be conducted within 5 years of the completion of the final 5-year review report.

## FIGURES

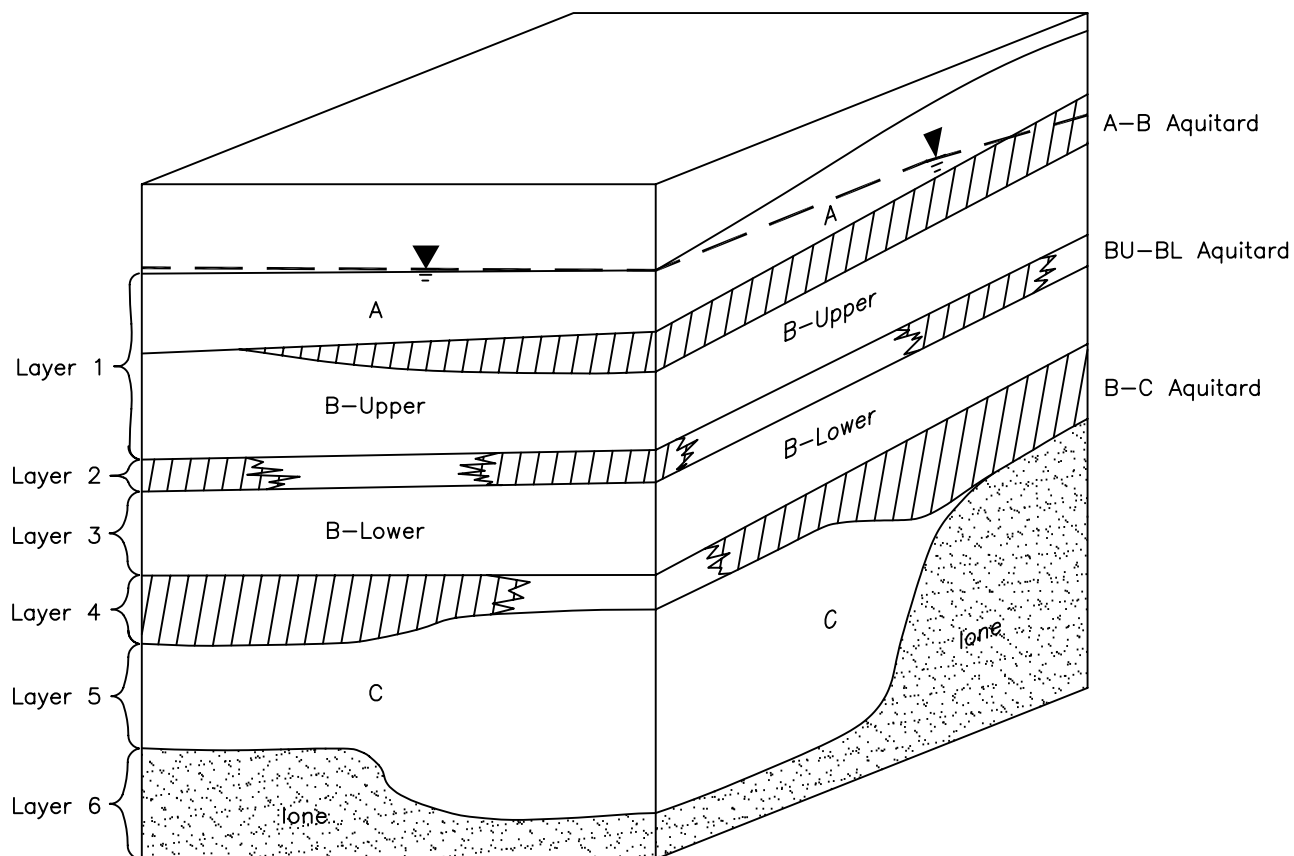


REFERENCE: USGS 7.5' Quadrangle, Palermo, CA



Figure 1  
Site Location Map  
Koppers Company, Inc.  
Superfund Site





### Explanation





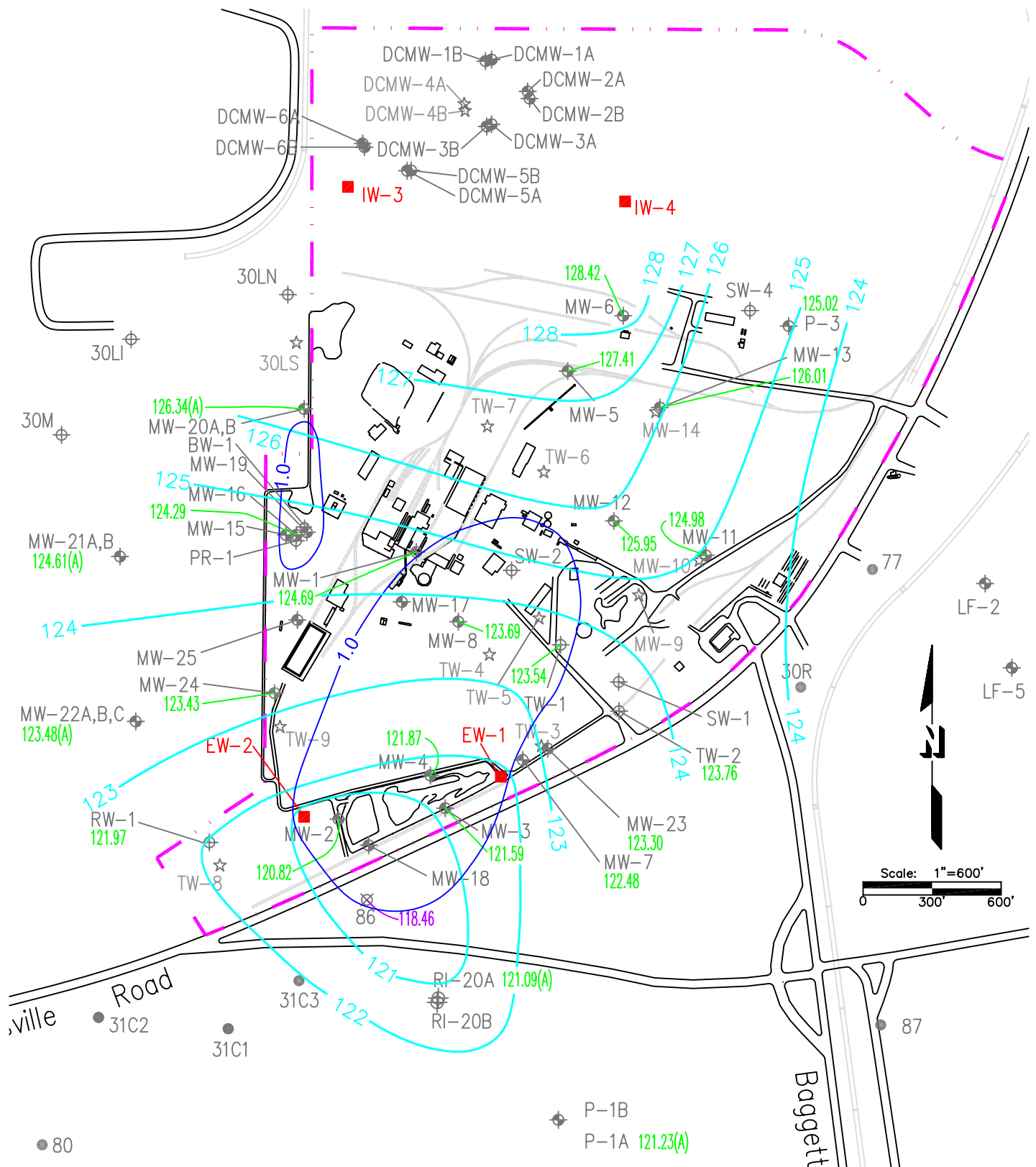
-  Silt and Clay
-  Sand and Silt
-  Gravels
-  Static Water Level

Figure Based on: Dames & Moore, 100% Design Report Initial Phase On-Property Groundwater Remediation System, July 1993

Figure 3  
Hydrostratigraphic  
Block Diagram



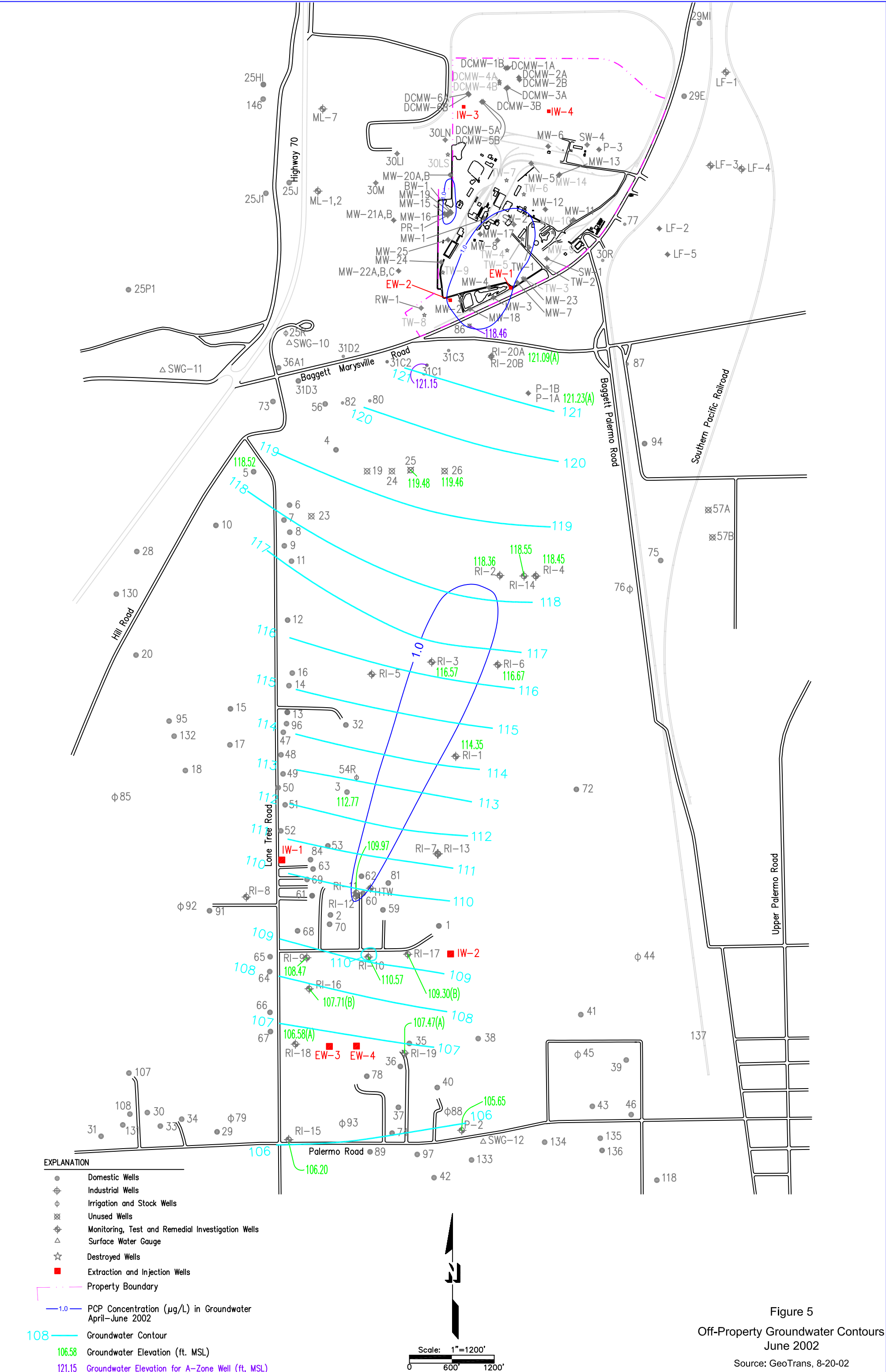
#### EXPLANATION

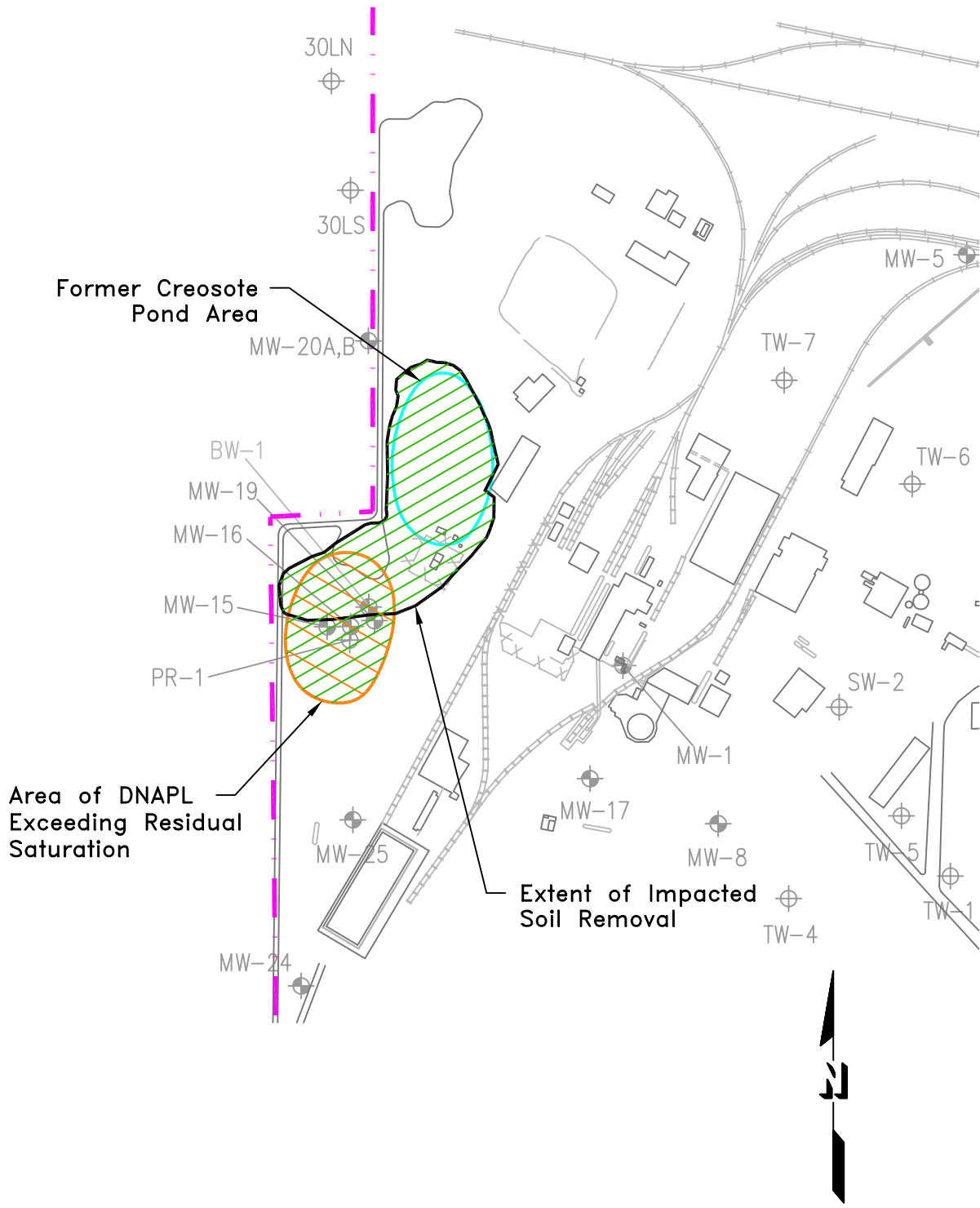
- |   |   |
|---|---|
| ● Domestic Wells                                    | ■ EW Extraction Wells                                 |
| ⊕ Industrial Wells                                  | ■ IW Injection Wells                                  |
| ⊙ Irrigation and Stock Wells                        | --- Property Boundary                                 |
| ⊗ Unused Wells                                      | — 1.0 PCP Concentration in Groundwater April/May 2002 |
| ⊕ Monitoring, Test and Remedial Investigation Wells | 121.59 Groundwater Elevation (ft MSL)                 |
| △ Surface Water Gauge                               | 124 Groundwater Contours                              |
| ☆ Destroyed/Abandoned Wells                         | 118.46 Groundwater Elevation for A-Zone Well (ft MSL) |

Figure 4

On-Property Groundwater Contours  
June 2002

Source: GeoTrans, 8-20-02





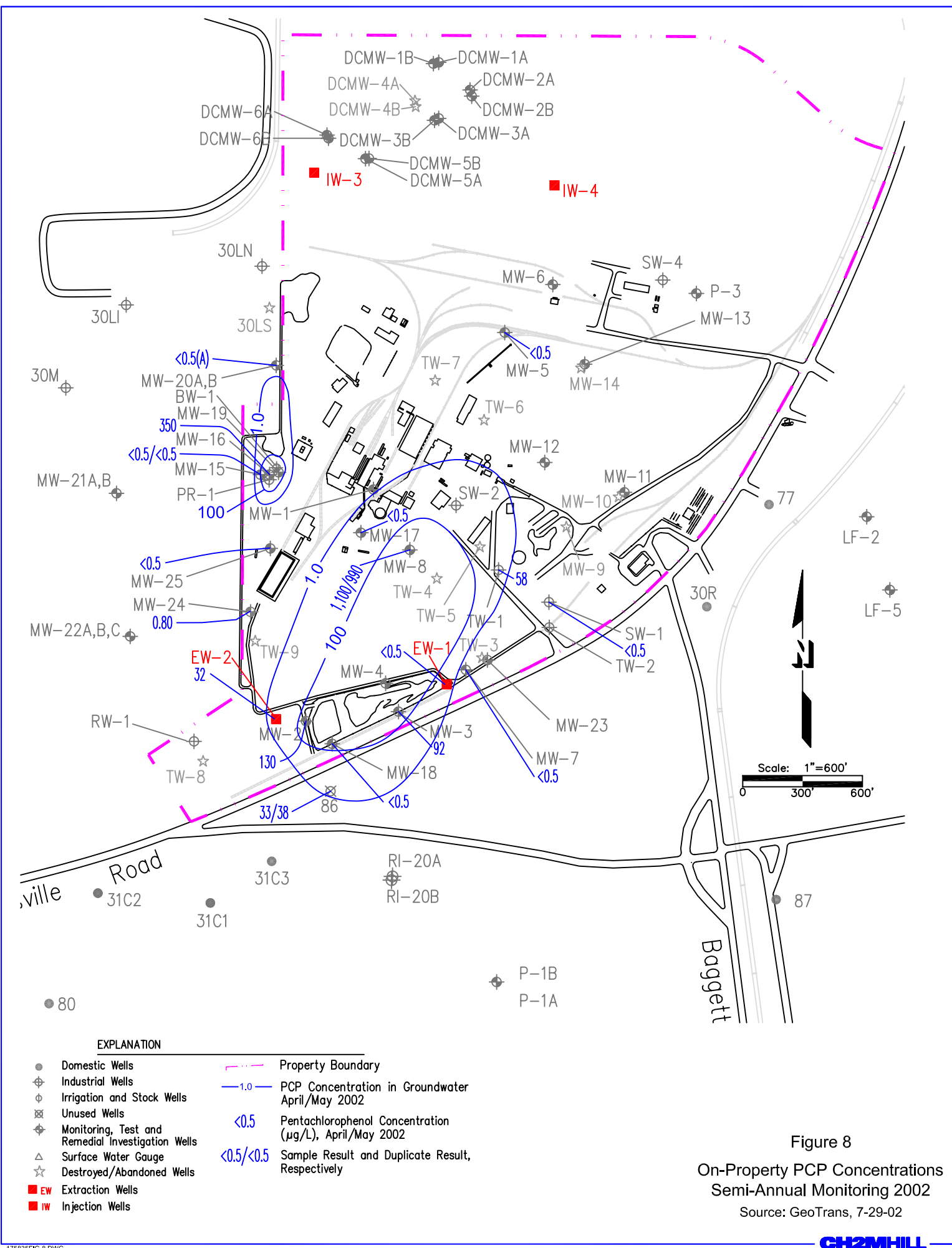
### Explanation

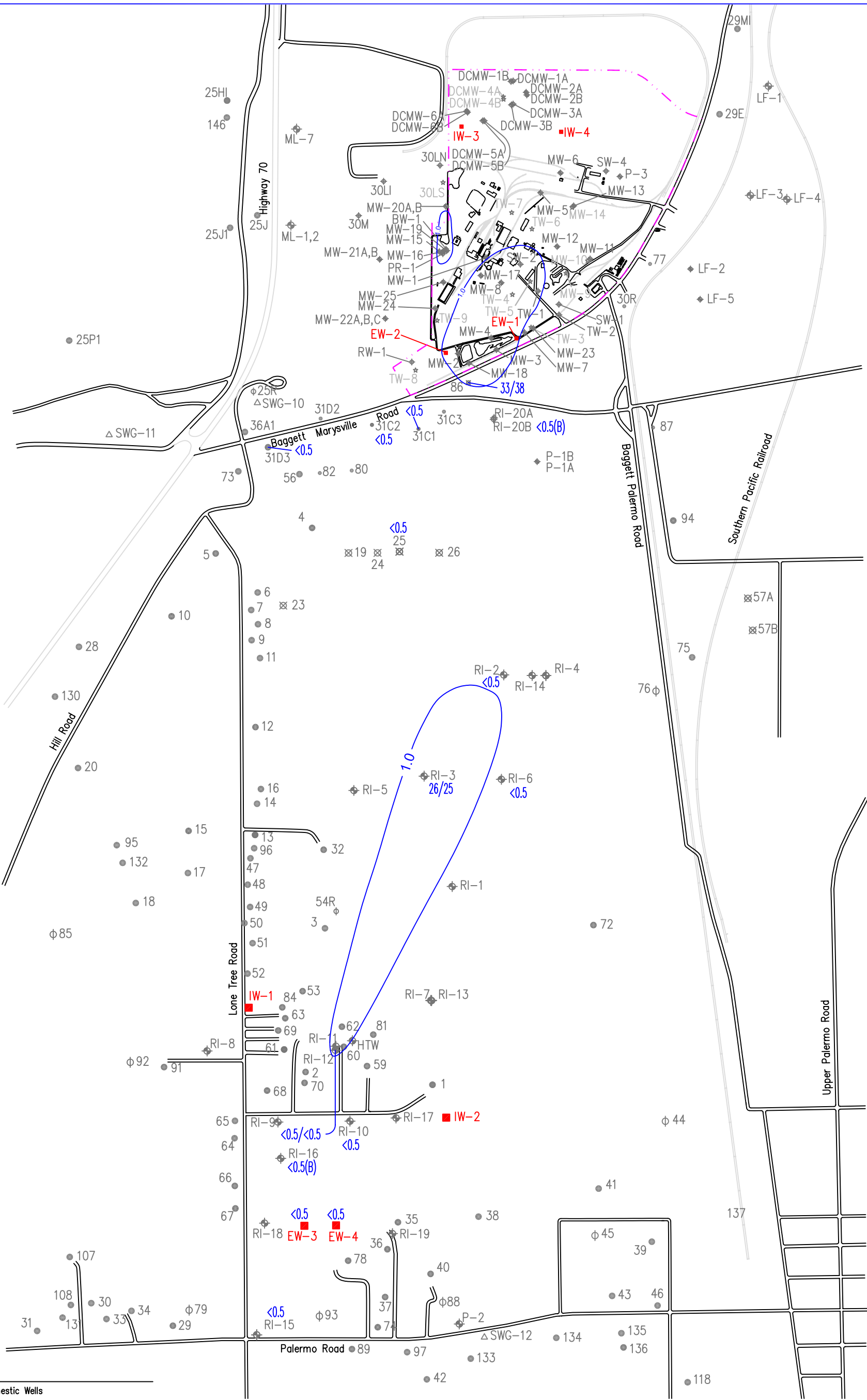
- |   |   |
|---|---|
| ● Domestic Wells                                    | ■ EW Extraction Wells                   |
| ⊕ Industrial Wells                                  | ■ IW Injection Wells                    |
| ⊕ Irrigation and Stock Wells                        | --- Property Boundary                   |
| ⊕ Unused Wells                                      | ■ Extent of DNAPL Identified in the AOI |
| ⊕ Monitoring, Test and Remedial Investigation Wells |   |
| △ Surface Water Gauge                               |   |

0 150 300  
Scale: 1"=300'

Figure 6  
Extent of DNAPL  
Identified in the TI Zone  
Source: GeoTrans, 12-9-97







- EXPLANATION
- Domestic Wells
  - ⊕ Industrial Wells
  - ⊕ Irrigation and Stock Wells
  - ⊗ Unused Wells
  - ⊕ Monitoring, Test and Remedial Investigation Wells
  - △ Surface Water Gauge
  - ☆ Destroyed Wells
  - Extraction and Injection Wells
  - Property Boundary

—1.0— Pentachlorophenol Concentration ( $\mu\text{g/L}$ ) in Groundwater May/June 2002

<0.5 Pentachlorophenol Concentration ( $\mu\text{g/L}$ ) May/June 2002

26/25 Sample Result and Duplicate Result, Respectively

Scale: 1"=1200'

0 600' 1200'

Figure 9  
Off-Property PCP Concentrations  
Semi-Annual Monitoring 2002  
Source: GeoTrans, 3-11-02



# **APPENDIX A**

## Documents Reviewed

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- HSI Geo Trans. 1999b. "Final Evaluation of Technical Impracticability of Groundwater Restoration in the Former Creosote Pond and Cellon Blowdown Area Koppers Company, Inc. Superfund Site (Feather River Plant)." March 8.
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- TRC. 1999. "Construction Documentation and Closure Report for Cell No. 2 and Associated Soil Removal Activities, Volume 1 of 3, Koppers Company Inc., Superfund Site, Feather River Plant, Oroville, California." October.
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## **APPENDIX B**

## APPENDIX B

# Applicable or Relevant and Appropriate Requirements

## Introduction

Section 121(d) of the Comprehensive Environmental Restoration, Compensation, and Liability Act of 1980 (CERCLA) states that remedial actions on CERCLA sites must attain (or justify the waiver of) any federal or more stringent state environmental standards, requirements, criteria, or limitations that are determined to be Applicable or Relevant and Appropriate Requirements (ARARs). Applicable requirements are those cleanup standards, criteria, or limitations promulgated under federal or state law that specifically address the situation at a CERCLA site.

If a requirement is not legally applicable, the requirement is evaluated to determine whether it is relevant and appropriate. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not applicable, address problems or situations sufficiently similar to the circumstances of the response action and are well-suited to the conditions of the site.

There are three categories of ARARs: (1) chemical-specific requirements, (2) action-specific requirements, and (3) location-specific requirements. Where no ARARs exist for a given chemical, action, or location, EPA may consider nonpromulgated federal or state advisories and guidance as To Be Considered criteria (TBC). Although consideration of a TBC is not required, if standards contained in the Record of Decision (ROD) are selected based on TBC, those standards are legally enforceable.

Chemical-specific ARARs are risk-based cleanup standards or methodologies which, when applied to site-specific conditions, result in the development of cleanup standards for contaminants of concern (COC).

Location-specific ARARs are restrictions placed on concentrations of hazardous substances or the conduct of activities because of the special locations that have important geographical, biological, or cultural features. Examples of special locations include wetlands, floodplains, sensitive ecosystems, and seismic areas.

Action-specific ARARs are technology-based or activity-based requirements or limitations on actions to be taken to handle hazardous wastes. They are triggered by the particular remedial activities selected to accomplish a remedy.

As part of the 1996 and 1999 ROD Amendments, a review of ARARs was conducted for groundwater cleanup levels at the Koppers Site. Based on that review, the ARARs were modified in the ROD Amendment in the following three respects: (1) the modified groundwater remedy required a waiver of all ARARs within the defined “technical impracticability” (TI) zone, (2) new remedial activities required the adoption of additional action-specific ARARs, and (3) the ROD Amendment incorporated newly promulgated requirements for barium and pentachlorophenol (PCP) that were necessary to ensure the protectiveness of the selected remedy.

The EPA has waived the ARARs that apply to the TI zone because it is technically impracticable, from an engineering perspective, to meet the standards. See CERCLA Section 121(d)(4)(c), 42 U.S.C. Section 9621(d)(4)(c). Additionally, the EPA determined that the federal and state MCLs for barium and PCP had changed. These revised MCLs were adopted as cleanup standards under the 1999 ROD Amendment. No other changes were made to the 1989 ARARs as a result of the ARAR review conducted in association with the 1999 ROD Amendment. The ROD Amendment did not affect the ARARs selected for the Soils Remedy (ROD Amendment No. 1, 1996).

## **5-year Review of ARARs**

The ARARs reviewed for this 5-year review are those contained in the 1999 ROD Amendment for groundwater and those contained in the 1996 ROD Amendment for the soils remedy. The ARARs for groundwater and soil are contained in Tables B-1 and B-3, respectively. Table B-2 contains numerical cleanup goals for groundwater as presented in the 1999 ROD Amendment.

The specific regulations cited for each ARAR contained in Table B-1 and B-3 were reviewed for changes since the 1999 ROD Amendment and prior 5-year review. The current versions of the California Code of Regulations (CCR) and Title 40 of the Code of Federal Regulations (CFR) were consulted via the internet to review pertinent updates. The August 2000 issue of "A Compilation of Water Quality Goals" (Central Valley Regional Water Quality Control Board, 2000) was reviewed to obtain updated numerical values for ARARs based on criteria listed in Table B-2. The Central Valley Regional Water Quality Control Board updates this document regularly through issuance of technical memorandums, which were also consulted in preparation of this review.

Groundwater cleanup goals based on human health risk or TBC were not updated from the values contained in the 1999 ROD Amendment. These cleanup goals include numerical concentration targets for isopropyl ether, boron, TCDD equivalents, and polynuclear aromatic hydrocarbons. No ARARs were identified that are more stringent than the current cleanup levels for these compounds contained in Table B-2. Likewise, risk-based soil remediation goals for TCDD and polynuclear aromatic hydrocarbons that were developed as part of the 1989 ROD have not changed because no ARARs warrant a change in these levels.

## **Summary of Potentially Significant Changes**

### **New Federal Maximum Contaminant Level for Arsenic**

On January 22, 2001, EPA adopted a new standard for arsenic in drinking water at 10 parts per billion (ppb), replacing the old standard of 50 ppb. The rule became effective on February 22, 2002. The date by which drinking water systems must comply with the new 10 ppb standard is January 23, 2006.

EPA (2001) reports that studies have linked long-term exposure to arsenic in drinking water to cancer of the bladder, lungs, skin, kidney, nasal passages, liver, and prostate. Noncancer effects of ingesting arsenic include cardiovascular, pulmonary, immunological, neurological, and endocrine (e.g., diabetes).

**TABLE B-1**  
**Applicable or Relevant and Appropriate Requirements for Groundwater**

<b>Source</b>	<b>Standard, Requirement, Criterion, or Limitation</b>	<b>Applicable or Relevant and Appropriate</b>	<b>ARAR or Performance Standard Applicability</b>	<b>Significant Changes in Regulation</b>
Porter-Cologne Water Quality Control Act (California Water Code Sections 13000, 13140, 13240, 13260, 13263, 13267, 13300, 13394, 13307)	State Water Resources Control Board Resolution No. 92-49 (as amended April 21, 1994) (Subparagraph IIIG)	Relevant and Appropriate	Applies to groundwater remedial actions. The groundwater cleanup system will be operated in such a way that the best water quality reasonable is restored.	On October 2, 1996, the SWRCB adopted Resolution No. 96-079, which amended SWRCB Resolution No. 92-49 to include provisions for a containment zone policy. Subparagraph IIIG is unchanged.
Porter-Cologne Water Quality Control Act (California Water Code Sections 13140-13147, 13172, 13260, 13262, 13267, 13304)	Title 27, CCR, Section 20410, Title 23, CCR, Section 2550.6	Applicable	Applies to groundwater remediation and monitoring of sites. Groundwater will be remediated and monitored according to Title 27/Title 23 regulations.	There have been no changes to these requirements that would significantly impact the current remedial actions or cleanup standards.
Safe Drinking Water Act (40 U.S.C. 300 et seq.)	National Primary Drinking Water Standards (40 CFR Part 141)	Relevant and Appropriate	Chemical-specific drinking water standard MCLs have been promulgated under the Safe Drinking Water Act (SDWA). Drinking-water MCL standards have also been promulgated under the SDWA. MCL goals (MCLG) above zero are considered chemical-specific ARARs under the National Contingency Plan (40 CFR 300.430(e)(2)(1)(B)). When the MCLGs are equal to zero (which is generally the case for a chemical considered to be a carcinogen), the MCL is considered to be a chemical-specific ARAR, instead of the MCLG (40 CFR 300.430(e)(2)(1)(C)).	Effective February 22, 2002, the arsenic MCL was changed from 50 ppb to 10 ppb. MCLs for other COCs remain unchanged since the 1999 ROD Amendment.

**TABLE B-1**  
**Applicable or Relevant and Appropriate Requirements for Groundwater**

Source	Standard, Requirement, Criterion, or Limitation	Applicable or Relevant and Appropriate	ARAR or Performance Standard Applicability	Significant Changes in Regulation
California Safe Drinking Water Act CCR Title 22, Division 4, Chapter 15, Articles 4, 5.5, and 8		Relevant and Appropriate	California primary drinking water standards establish enforceable limits for chemicals that may affect public health or the aesthetic qualities of drinking water. However, only those state requirements that are more stringent than federal standards are ARARs. Recently, a state MCL for barium was changed to 1,000 ppb.	California has not adopted the revised federal MCL for arsenic. State MCLs for COCs are unchanged since the 1999 ROD Amendment (see Table A-2).  Article 8 has been moved to Article 16.
Hazardous Waste Control Act (California Health and Safety Code 25100 et seq.)	27 CCR, Division 2, Subdivision 1	Applicable	Title 27 establishes waste and siting classification systems and minimum waste management standards for discharges of waste to land for treatment, storage, and disposal. Title 27 also contains corrective action provisions for responding to leaks and other unauthorized discharges. Spent granulated activated carbon will be classified and handled in accordance with Title 27 requirements.	There have been no substantive changes to this regulation since the 1999 ROD Amendment.
Resource Conservation and Recovery Act Subpart AA (22 CCR 66265.1030 et seq.)	Article 27 Air Emission Standards for Process Vents (22 CCR 66265.1030-66265.1035)	Relevant and Appropriate	Applies to treatment, storage, and disposal facilities with process vents associated with solvent extraction or air or steam stripping operations managing Resource Conservation and Recovery Act hazardous wastes with organic concentrations of at least 10 ppm. These operations must reduce total organic emissions below specified device to reduce total organic emissions by 95 percent by weight.	There have been no substantive changes to this regulation since the 1999 ROD Amendment.

**TABLE B-2**  
**Cleanup Standard for Chemicals of Concern in Groundwater Outside the TI Zone**

Chemicals of Concern	Remedial Action Level	ARAR or Performance Standard Applicability
PCP	1 ppb <sup>a,b</sup>	Federal MCL
Isopropyl Ether	2,800 ppb	TBC from 1989 ROD
Barium	1,000 ppb <sup>a</sup>	California MCL
Boron	1,200 ppb	TBC from 1989 ROD
Arsenic	Background (27 ppb)	Remedial standard, 1989 ROD
Chromium	Background (35 ppb)	Remedial standard, 1989 ROD
PCDDs/PCDFs (dioxin) as 2,3,7,8-TCDD Toxic Equivalency Factor	5.3x 10 <sup>-7</sup> ppb <sup>b</sup>	Remedial standard, 1989 ROD
Total Carcinogenic PAHs	0.007 ppb <sup>b</sup>	Remedial standard, 1989 ROD

<sup>a</sup>Update from remediation standard in 1989 ROD - other standards unchanged

<sup>b</sup>Waived for TI zone

**TABLE B-3**  
**Location- and Action-specific ARARs**

Citation	Requirement
40 CFR 264.18 as implemented through California EPA, Department of Toxic Substances Control, Hazardous Waste Regulations, Title 22, Chapter 14 22") 66264.18	Requires that new facilities not be located within 61 meters of a fault which has been displaced in Holocene time. In addition, a landfill located in a flood-plain must be designed, constructed, operated, and maintained to prevent washout by a 100-year flood or must otherwise meet standards designed to withstand such a flood.
40 CFR 264.301(c) as implemented through Title 22, 66264.301(c)	Design standards for the liner system, the leachate collection and removal systems, and leak detection systems.
Title 22, 66264.301(a)(1)(B)	Requires foundation to be placed on a foundation or base capable of providing adequate support to prevent liner failure.
40 CFR 264.301(g)-(i) as implemented through Title 22, 66264.301(g)-(i)	Construction of a run-on control and run-off management system, management of a collection and holding facilities for such systems, and control of any wind dispersal of particulate matter from the landfill.
40 CFR 264.303(a) as implemented through Title 22, 66264.303(a)	During construction, the landfill liner must be inspected to ensure that it meets the standards.
40 CFR 264.310(a) as implemented through Title 22, 66264.310(a)	Requirements for the design and construction of the landfill cover.
40 CFR 264.14 as implemented through Title 22, 66264.14	Maintaining security during placement of contaminated soil and debris in the landfill.
40 CFR 264.15 as implemented through Title 22, 66264.15	General requirements for inspection of the landfill during placement of contaminated soil and debris.

**TABLE B-3**

Location- and Action-specific ARARs

<b>Citation</b>	<b>Requirement</b>
40 CFR 264.314 and 264.316 as implemented through Title 22, 66264.314 and 66264.316	Requirements for management of liquids and containers in the landfill.
40 CFR 264.117 as implemented through Title 22, 66264.117	Requirements for post-closure maintenance and care of the landfill.
40 CFR 264.118 as implemented through Title 22, 66264.118	Requires written post-closure plan.
40 CFR 264.91(a), 264.94, 264.97 and 264.98 as implemented through Title 22, 66264.91(a), 66264.94, 66264.97 66264.98	Requirements for detection and evaluation monitoring, including monitoring of soil pore and liquids, to assure that the landfill does not release any contaminants to groundwater.
40 CFR 264.303(b) as implemented through Title 22, 66264.303(b)	Requirements for inspections during the time when placement of contaminated soil and debris in a landfill is occurring.
40 CFR 264.552 as implemented through Title 22, 66264.552	Requirements for designating and managing Corrective Action Management Unit.
Butte County Air Pollution Control District Rules 201, 202, 203, & 207	Requirements regarding nuisance conditions, emissions, and fugitive dust.
40 CFR 6.302(a) and Appendix A; Executive Order 11990	Requirements to avoid or mitigate impacts to wetlands.

The current standard of 50 ppb was set by EPA in 1975, based on a Public Health Service standard originally established in 1942 (EPA, 2001). A March 1999 report by the National Academy of Sciences concluded that the current standard does not achieve EPA's goal of protecting public health and should be lowered as soon as possible.

The new arsenic standard for drinking water of 10 ppb was set by EPA to protect consumers against the effects of long-term, chronic exposure to arsenic in drinking water (EPA, 2001).

The new MCL for arsenic is less than half the Site background concentration. The Water Quality Control Plan for the Sacramento and San Joaquin River Basins expressly states that its water quality objectives do not require improvement over naturally occurring background concentrations. The background concentration for arsenic of 27 ppb will continue to be the cleanup standard for groundwater at the Koppers Site.

### **California Toxics Rule**

Section 303(c)(2)(B) of the Clean Water Act requires that states adopt numeric water quality criteria for priority pollutants as part of the state's water quality standards. The Inland Surface Waters Plan (ISWP) and the Enclosed Bays and Estuaries Plan (EBEP) of April 1991, together with the Regional Water Quality Control Board Basin Plans, created a set of water

quality standards for California that were intended to satisfy the Section 303(c)(2)(B) requirement. The ISWP and the EBEP contained the priority toxic pollutant criteria, and the Basin Plans contained the designated uses for water bodies as well as conventional pollutant objectives. The EPA approved the plans but noted a lack of criteria for some pollutants. These disapproved aspects were included in EPA's 1992 promulgation of the National Toxics Rule.

In 1994, the State Water Resources Control Board (SWRCB) rescinded the ISWP and the EBEP in response to a court ruling invalidating the plans (the Basin Plans remain in effect). At that point, California was without statewide water quality standards for the majority of priority pollutants for the State's non-ocean surface waters. Because the State was not fully implementing the requirements of Section 303(c)(2)(B), EPA promulgated the California Toxics Rule (CTR) in May 2000 to replace the criteria that were rescinded by the state court. The National Toxics Rule also remains in effect in California for certain water bodies and pollutants.

The EPA and SWRCB have agreed to pursue a collaborative approach to re-establishing the regulatory framework for water quality standards in California. This approach consists of two phases, the first of which involves the adoption of statewide measures to implement the water quality criteria established in the CTR. In Phase 2, the SWRCB will consider the adoption of appropriate statewide water quality objectives for toxic pollutants.

Phase 1 was completed when, on March 2, 2000, the SWRCB adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (Policy). This state Policy applies to dischargers of toxic pollutants into the inland surface waters, enclosed bays, and estuaries of California. The Policy establishes implementation provisions for priority pollutant criteria promulgated by the EPA through CTR and the National Toxics Rule (those previously promulgated for specific water bodies), and for priority pollutant objectives established by the RWQCBs in their water quality control plans.

The CTR applies to surface water discharges and does not establish cleanup levels for groundwater. The CTR criteria could apply to the quality of treated groundwater discharged from the existing pump-and-treat system if such treated groundwater were to impact surface water. Since treated groundwater is re-injected into the aquifer, the CTR criteria do not apply for the current configuration of the pump and treat system. Therefore, this regulation will not be included as an ARAR for the Koppers Site.

In addition to the chemical-specific ARARs summarized in Tables B-1 and B-2, the action-specific and location-specific ARARs contained in the 1996 ROD Amendment were reviewed to determine if requirements had been changed or updated. Based on our review, none of the requirements contained in Table B-3 have been changed or updated in a way that would impact the current remedial actions or require a change in the existing ARARs.

In summary, the ARARs established in the 1989 ROD, as updated by the 1996 and 1999 ROD Amendments, do not require revision to ensure the protectiveness of current remedial actions or to comply with state or federal requirements.

## References

California Regional Water Quality Control Board, San Francisco Bay Region. 1995. "Water Quality Control Plan." June 21.

U.S. Environmental Protection Agency (EPA), Region IX. 2001. "Fact Sheet: Drinking Water Standard for Arsenic." EPA 815-F-00-015. January.

EPA. 2002. "Draft Implementation Guidance for the Arsenic Rule Drinking Water Regulations for Arsenic and Clarifications to Compliance and New Source Contaminants Monitoring." EPA-816-D-02-005. March.